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ABSTRACT

These lesson plans for teaching soybean production in a secondary or postsecondary vocational agriculture class are organized in nine units and cover the following topics: raising soybeans, optimum tillage, fertilizer and lime, seed selection, pest management, planting, troubleshooting, double cropping, and harvesting. Each lesson plan contains objectives, a discussion guide, action activities, suggested time schedule, transparency notes, and transparency masters. Future Farmers of America activities are suggested for some lessons, and materials suitable for duplication and handing out to students are provided. (KC)

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Soybean Production Lesson Plan

To help vocational agriculture instructors easily serve their students' educational needs, the American Soybean Association and BASF Wyandotte Corporation have developed this in-depth lesson plan focusing on soybean production in the 1980's.

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CE 032 133

To the instructor:

Guiding the learning of your students is no small task. We at BASF and ASA wish to commend you for your dedication and efforts in behalf of this nation's young people. It is our desire that this teachers guide will enhance your student's knowledge about soybeans and at the same time save you planning time.

Keep in mind that soybeans are grown over a wide portion of the United States. This has encouraged us to include some items that are more important in one area than another part of the US.

Please feel free to edit this material for your own community situation and needs.

Note for your students however, that young people change jobs and move frequently during their careers. We would like you to provide your classes with the "big" picture of soybean production in this nation.

A brief word about the approach we have used in preparing these lesson plans:

First, search your local area for the "text" material you may want to use for your students. This might include several magazine sources, sales material for seed, machinery, and herbicide companies, and some library copies of text books on soybean production.

The teacher's guide includes discussion topics for each unit. These can be duplicated for your class members, and they will find them a very useful guide for their notes. But, they are **not** short answer questions or objective in nature.

Our philosophy when developing this material was that your soybean growers, chemical, machinery, and seed dealers would have the most current and appropriate data on soybean production.

We encourage you to use **them** as your knowledge bank for your students to draw upon as they learn about soybean production.

Introductory comments would be appropriate for the "Action Activities" also. There is an action activity for each discussion topic or question. When discussion and the action activity are used together, your class will not be a lecture or memorization exercise.

You will be the moderator, the stimulator, the time keeper, the coordinator, or you could be called the facilitator. Your position is to help the class members learn how to answer questions posed in class by using community resources. Your students will solve problems much like a farmer solves problems. Your guidance will help your class members become problem solvers, not robots that merely repeat facts.

This approach is also evident on the laboratory exercises. The students are asked to select an evaluator, but encouraged not to use their vo-ag instructor. You are not placed in the role as the critic of your student's work.

You can then proceed to work **with** your class as an advisor. This is similar to the approach you use with the FFA Chapter.

Vocational Agriculture has always been a practical course for students of all ability levels. This teaching unit should help you make your unit on soybean production appropriate for all the students in your class.

By using the community as the text, incorporating the FFA, and promoting strong SOE programs, your agricultural education program will become vocational education.

We again want to congratulate you on your efforts. ASA and BASF will continue to support your department. Don't hesitate to ask if we can assist you further.

Have a good teaching year.

BASF Wyandotte Corporation
American Soybean Association

TEACHERS GUIDE

Objectives of Unit 1

Upon completion of this unit, each student will be able to:

1. List ten requirements for soybean production.
2. Calculate the costs and returns from raising soybeans.
3. List five advantages of soybeans when grown in the rotation.
4. List two disadvantages of growing soybeans in the rotation.
5. Discuss for five minutes the future of soybean production.

Discussion Guide:

The discussion guide provides specific questions you may ask your class. Each question is followed by a "hands on" activity to help your class come alive. You may want to give each student a copy of the guide to fill in and to aid their note taking. Your efforts to develop student initiative to blend community resources into your lessons will pay big dividends in interest and student effort.

Action Activities:

Suggested projects to make your class interesting, student centered, and community based. While you may do some of the "action activities" yourself, it is suggested that your students do most of them. Items included for this unit are:

	Student(s) Assigned
1. Soybean plant collection	_____
2. Overhead transparencies on production and consumption	_____
3. Bulletin board display illustrating land, labor, equipment, and capital	_____
4. Discussion group on crop profit expectations	_____
5. Slide series on costs to raise soybeans	_____
6. Taped interview with a young farmer about advantages and disadvantages of raising soybeans	_____
7. Survey of farmers to determine trends	_____

FFA Demonstration Plots:

FFA Chapters are often short of money. What better way to earn their funds than to raise soybeans? The extra payoff for the vo-ag instructor is that it fits his instructional plan. Avoid the pitfall of trying to "test" numerous varieties, herbicides, and fertility programs. The need for replication makes accurate "testing" almost impossible. A better goal for your plot would be to demonstrate the **best** way to raise soybeans for your community.

FFA Demonstrations:

Valuable learning activities are the result of subject matter demonstrations (5-7 min.) at each FFA meeting. The leadership skills learned here can be transferred to other community organizations 4-H, JCs, etc.

Specific demonstrations might be explanations of how the plant grows, how the seed is used, why soybeans are grown locally, the future of soybean production.

The better demonstrations can be used at adult farmer class programs, young farmer meetings, and for Lions or other club meetings.

Suggested Time Schedule

Unit 1 1 week (5 hours)
Some "action activities" should be assigned prior to starting this unit. Specifically #2 and #5.

Transparency Notes:

BASF-1-1 Soybeans have been successful and profitable in the past.

But your students (adult and high school) really want to know about the next 20 years. Strive to set the stage with this transparency that each person has some control of his destiny, especially if he can attain high yields.

BASF 1-2-3 These two transparencies are designed to localize your economics. You may want to invite a farmer to your class to fill in his own costs.

The key is to strive for realism early in your teaching of soybean production. Make an extra effort to be "true-to-life" at this stage. Soybean production is expensive and requires top management to be profitable. (Below average farm management will result in a loss.)

BASF 1-4 If BASF 1-2 & 3 didn't make your students want to be top managers, maybe this transparency will help. Room is provided to place a bottom row of figures for your class's best guess for market prices if desired. Don't overstress market price however. Do stress the importance of yield.

BASF 1-5 If your FFA Chapter has a demonstration plot you can use this transparency to encourage high yields. Or, encourage those students with SOE programs with soybeans to attain high yields.

BASF 1-6 The Discussion Guide, lab, activities, etc. stress the parts of soybean production. Use these transparencies to review the chapter, but also guide your students (adult or high school) to think of soybean production as a management system.

Discussion Guide
Unit 1

Should you grow soybeans?

Name _____

1. Why grow soybeans?

Action activity: Collect soybean plants and several varieties of soybean seed for display. Label each.

2. Soybeans have been called the "Cinderella Crop". Trace the history of soybean production in the U.S.

	Bu. Produced
Decade of 40's	
Decade of 60's	
Decade of 80's	

Action activity: Develop and use the overhead projector to project 3 transparencies showing (1) world production of soybeans; (2) where soybeans are produced in the U.S.; (3) and where soybeans are used in the world. Obtain your information from the "Soybean Blue Book" available from the ASA. (25^{00})

3. What is needed to raise soybeans?
   Land: (type, how much, availability)

   Labor: (how much, when, supply)

   Equipment: (how much, size, cost)

   Capital: (how much, when, interest rates)

Action activity: Prepare a bulletin board display for your classroom illustrating each of the requirements. Be specific for this school district.

4. Which crop would you expect to be the most profitable next year? Compare at least one crop with soybeans. Use Transparency BASF 1-1 as a guide.

Action activity: Organize a discussion featuring a local banker and at least one young farmer in your area. Serve as moderator and prepare at least ten questions on paper before the discussion. Questions should deal with crop profits.

5. The production of a crop is expensive. One way to more fully understand these costs is to identify the costs that are "fixed" (land charge, taxes, equipment) and those that vary if the crop is grown. These costs are called "variable". Which is greater - the fixed costs or variable costs? How much?

Action activity: Prepare a slide series illustrating the different costs which a soybean producer must pay before a profit results. Identify the fixed and variable costs.

6. What are the advantages of soybean production?
   A.

   B.

   C.

   D.

   E.

   What are the disadvantages of raising soybeans?
   A.

   B.

   C.

Action activity: Tape an interview with a young farmer in this area. Ask questions to bring out the advantages of soybeans on his farm. Also seek to determine how he copes with the disadvantages. Submit your tape to a local radio station for possible use and criticism.

7. Describe how you feel soybean production will fit into the future of the following:
   The World:

   United States:

   Your community:

   Your personal life:

Action activity: Develop a survey to collect information from 10-15 area farmers. Include questions to measure the trends in the following areas: acres grown, varieties planted, rent fees, rotations used, profitability per acre, etc.

LABORATORY EXERCISE

Name _____

Date _____

Objective: Upon completion of this activity you will be able to describe in detail the extent of soybeans grown in your school district.

Evaluator _____
(Not vo-ag instructor)

Materials Needed:
Note pad and pencil
Plat book
Transportation

Procedure:

Step 1 Review Chapter 9 in the text "Modern Soybean Production".

Step 2 Define area (county, school district, township, sections, etc.)

_____

_____

_____

Step 3 Draw field boundaries on the plat book.

Step 4 Color those fields growing soybeans. You may want to identify double crop soybeans separately.

Step 5 Summarize the results and post maps on class room wall.

Evaluator's Comments: _____

_____

_____

_____
(Signed)

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

TEACHERS GUIDE — Optimum Tillage Unit 2

Objectives of Unit 2

Upon completion of this unit, each student will be able to:

1. List three qualities of a good seedbed.
2. Compute germination percentage and list 3 causes of poor germination.
3. Discuss for 3 minutes how tillage systems are changing and why.

Discussion Guide:

The typical classroom in vo-ag is a setting of chairs and tables to encourage discussion, writing, and team work. The teacher generally starts the discussion and many teachers like a series of questions to start the class. This has been provided in the discussion guide. Space has also been provided for notes by the students.

Action Activities:

All sitting and talking with no doing causes discipline problems and lack of attention. Keep the class involved by assigning action activities to your students. Some may need to be assigned early, especially #1 and #5. Action activities suggested for this unit are:

	Student(s) Assigned
1. Survey to determine how ground is prepared	_____
2. Bulletin board in preparing soybean seedbed	_____
3. Machinery dealers speak	_____
4. Panel discussion by farmers	_____
5. Grow soybeans in different seedbeds	_____

Demonstrations:

Your FFA Chapter could select a new way to prepare the seedbed and use this method on their demonstration plot. Keep the trials to a minimum and keep accurate records of your costs and hours used.

Suggested Time Schedule:

Unit 2 — 2 weeks (5-10 hours)

Transparency Notes:

BASF 2-1 — Many machines can develop adequate seedbeds. It appears that no two farms do it alike. Can your class tell why? This is your key to discussion -- draw from them and reading assignments that developing a good seedbed varies because of the variables involved on each farm.

BASF 2-2 — As your class identifies the variables, write them in on the thought circles above the farmer's head. They should include: time, erosion problems, present equipment, energy costs, weeds, soil type, drainage problems and others.

BASF 2-3 — Each school district will have their own answers to these questions. But, in general the trend in the US is toward working the ground less to conserve energy and to protect the soil from erosion.

Name _____

Optimum Tillage

1. List several qualities of a good seedbed:

   a.

   b.

   c.

Action activity: Survey 5 to 10 farmers to determine how they prepare their ground prior to planting soybeans. Report your findings to class.

2. Selection of a tillage system is a continuous process for the typical soybean producer. Explain how each of the following affects the tillage system used.

   a. Time requirements

   b. Erosion problems

   c. Energy costs

   d. Weed problems

   e. Soil type

   f. Drainage problems

   g. Equipment available

Action activity: Prepare a bulletin board display showing how ground is prepared for planting soybeans.

3. Several tillage systems are in common use today. Discuss each.

   a. Conventional (equipment and type of seed bed)

   b. Minimum (equipment and type of seed bed)

   c. No till (equipment and type of seed bed)

Action activity: Visit with one or two machinery dealers and ask them to visit class to hand out brochures on common tillage machines. Encourage your class members to review them and ask questions about using these machines to raise soybeans in this area.

4. Planting equipment can vary by area, soil type, other crops grown, and farmer preference. Review machinery dealer ads and interview farmers. Discuss below your definitions of the following:

   Conventional tillage:

   Minimum till planters:

   No-till planters:

   Action activity: Serve as moderator of a panel discussion of 2 to 4 farmers that use different types of planters. Prepare several questions on paper prior to the panel discussion.

5. Any type of tillage system must meet the test of providing a good stand after planting. Germination is the key. What type of seedbed will encourage germination?

   Action activity: Using cut off milk cartons, plant soybeans in several different seedbeds. Provide the same amount of water each day.

LABORATORY EXERCISE

Name _____

Date _____

Objective: Upon completion of this laboratory exercise you will be able to see the effect of soil compaction and different tillage systems.

Materials Needed:
Spade
Water
1 lb. coffee can
Watch
Tape measure

Evaluator _____
(not your vo-ag instructor)

Procedures:

1. Read Unit 3 in FMO Manual: Tillage available from John Deere.
2. Dig holes 6 to 8 inches deep in several areas representing different amounts of soil compaction (fields, inter-row, lanes, fields using different tillage systems).
3. Pour a coffee can of water into the holes and measure the time needed for the water to percolate into the soil in each location.
4. Record your results. Discuss your results with a representative of the Soil Conservation Service.
5. Why does water percolate more slowly in some areas?

   _____

   _____

6. What effect does percolation have on crop production in your area?

   _____

   _____

7. Which system will produce the best yields? Why?

   _____

   _____

Evaluator's Comments: _____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

TEACHERS GUIDE

Aglime And Fertilizer
Unit 3

Suggested Time Schedule:

Two weeks (10 hours). Several activities should be planned and started prior to teaching this unit. This unit assumes your students have had a specific soil fertility unit. If they have not had this unit, more time will be necessary.

Equipment Needed:
Overhead projector
Bulletin Board Materials
Telephone
Camera

FFA Activities:

Many chapters collect soil samples to earn money for their chapter treasuries.

Other chapters may make display booths for county fairs or other ag shows. Students needing demonstration or public speaking topics can use soil fertility as the basis of their contest entries.

Demonstrations:

The soybean yield contests held in most localities can provide the incentive for the chapter to develop a high fertility demonstration plot. Keep costs appropriate so that the plot is an economic success.

Action Activities:

"All talk and no do?" These suggestions can help stimulate your thinking so your class "Learns by Doing" and "Does to Learn".

While you may do some of the "Action Activities" yourself, it is our intention that your students do most of them. Instructions are not complete - - they are just starters for your class members. Fill in detail as needed.

Action activities included in this unit are:

	Student(s) Assigned
1. Obtain soil sampling instruction sheet	_____
2. News article featuring aggressive young farmer	_____
3. Secure chart on nutrients available at different pH levels.	_____
4. Secure aglime and fertilizer prices	_____
5. Collage of application methods	_____
6. Bulletin board on how to raise fertility level	_____
7. Average soil test information	_____
8. None suggested	_____

Transparency Notes:

BASF 3-1 Soil testing to measure changes in soil fertility is very important. High soil fertility and high yields are partners. This transparency is your lead in to soil testing. We assume you have the actual soil testing information sheets, sample sacks, soil probe, etc. to show the class after you use this transparency. It would be appropriate to follow the discussion of the equipment with a transparency made from an actual soil test report from your area.

BASF 3-2 Soil fertility changes. Write on the transparency why.
(a) Different crops use different nutrients
(b) High yields remove more nutrients than low yields.
(c) Soil fertility changes slowly, so you need to monitor changes continuously

BASF 3-3 Aglime to adjust soil pH is the most important part of soil fertility. The soil, plant residue, and air can supply a large share of needed nutrients - - if the pH is near neutral.

BASF 3-4 High fertility of soil implies a general level of soil fertility - - not high rates of fertilizer in any one year. These quotes from University studies all point up the need for high soil fertility.

Aglime and Fertilizer Needs for Soybeans

Name _____

1. Soils are not alike. Not only have they been formed differently by nature, they have been treated differently by farmers. Many times different parts of fields should be treated differently. Describe how you can tell how to make the correct balance of nutrients available.

Action activity: Obtain a soil sampling instruction sheet for each member in the class. Hand them out to your classmates and give them a few minutes to review it. Then lead a discussion on soil sampling.

2. Soybeans require large amounts of mineral elements to produce high yields. For example, a 60 bushel crop might contain in the stem, leaves, seed, and roots as much as 300 pounds of N, 80 pounds of P_2O_5, and 140 pounds of K_2O. Why do many farmers ignore soil fertility in their soybean management program?

Action activity: Write a news article on the soil fertility program of a young aggressive farmer in your community. Stress the soil fertility of the complete rotation. Submit a photo and the story to a local paper.

3. Aglime is important in a soil fertility program. Since soybeans are legumes, pH should be adjusted to optimum levels - - near neutral (6.8 to 7.0). Why is a neutral soil desired?

Action activity: Secure a chart showing nutrient availability at different pH levels. Discuss this chart with your classmates. If possible give them a copy or have them make notes.

4. Why will the cost of fertilizer affect the amount of aglime and fertilizer applied to your soil?

Action activity: Contact an aglime producer and at least two suppliers of fertilizer. Obtain the cost of these items and the application charges. Duplicate these cost items and hand them out to your classmates.

5. Fertilizer and aglime must be applied to the soil to increase soybean yields. Which of the following application methods are appropriate for farms in your area?

	Aglime	Nitrogen	Phosphorus and Potassium
Plow Down			
Starter			
Side Dress			
Pre-Plant			
Aerial			
Farmer Application			
Custom Application			

Action activity: Prepare a collage of pictures from magazines showing how aglime and fertilizer can be applied.

6. Aglime and fertilizer are all part of the soil fertility program that a farmer maintains on his farm. Outline the soil fertility program that you would recommend if your school owned 10 acres for your FFA Demonstration Plot.

Why might the soil fertility program differ on 2 fields -- one owned by the farmer and one rented by the same farmer?

Action activity: Make a bulletin board display illustrating a soil fertility program designed to raise above average soybean yields for your area.

7. Describe the differences in soil fertility in different parts of your school district. Why are these differences apparent? Which type of farmer is correcting these differences? How?

Action activity: Telephone or write to an area soil testing laboratory to ask them to provide the average soil test report for your area and to provide several extreme examples of soil fertility levels for area farms. Discuss each in class.

8. Cost and returns are all important to a young farmer wanting to make a career of farming, especially raising soybeans. Develop a soil fertility program for a specific field.

What rotation will be used? _____

	Crop _____		Crop _____		Crop _____		Crop _____	
	Cost/a	Needs	Cost/a	Needs	Cost/a	Needs	Cost/a	Needs
Soil test report								
Aglime	$ _____	_____	$ _____	_____	$ _____	_____ #	$ _____	_____
Nitrogen	$ _____	_____	$ _____	_____	$ _____	_____ #	$ _____	_____
Phosphorus	$ _____	_____	$ _____	_____	$ _____	_____ #	$ _____	_____
Potassium	$ _____	_____	$ _____	_____	$ _____	_____ #	$ _____	_____
Other	$ _____	_____	$ _____	_____	$ _____	_____ #	$ _____	_____
Total	$ _____		$ _____		$ _____		$ _____	

Use your local grain price - - how many extra bushels are needed to pay for the needed nutrients to provide a good soil fertility program?

_____ _____ _____ _____

Name _____

Date _____

LABORATORY EXERCISE #1

Objective: Upon completion of this exercise you will be able to take a representative soil sample from a field.

Materials needed:
Field to be sampled (size, location, etc.)

Evaluator: _____
(Not vo-ag instructor)

_____

_____

Probe and mixing container
Soil map (Soil Conservation Service)
Acid (dilute HC1)

Procedure:

1. Obtain soil-test forms from a local fertilizer dealer or from the county extension service. Review instructions carefully.
2. Divide the field into representative areas to be sampled.
3. Collect core samples from different parts of the field according to soil type. (Use acid to separate high-lime soils from other soils.)
4. Mix soil cores and package soil. Draw map and label soil package carefully.
5. Send samples to soil testing lab.
6. Study soil map, test results, and instructions for use.
7. How often would you sample soils on this farm? _____
8. How long did it take to collect good soil samples? _____
9. Why is the soil sample system of measuring soil fertility ignored by many farm operators?

Evaluator's Comments: _____

_____

_____

_____

_____

20

LABORATORY EXERCISE #2

Name _____

Date _____

Objective: Upon completion of this exercise you will be able to use soil-test reports to apply the correct fertilizer and aglime amounts to a farm field.

Materials needed:
Soil-test reports from local labs

Evaluator: _____
(Not vo-ag instructor)

Field for study (location and size): _____

_____

Procedure:

1. Review carefully the instructions that accompany the soil-test report.
2. Draw a map showing soils in the field. Determine and carefully list the fertility needs of each soil type. (Aglime & fertilizer).
3. Price your fertilizer and aglime recommendation at two or three local fertilizer dealers. List costs below:

Dealer	_____	_____	_____
Location	_____	_____	_____
Cost of Material	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
Application Cost	_____	_____	_____
Total Costs	_____	_____	_____
Per Acre Costs	_____	_____	_____

4. How would you fertilize this particular field?

_____

_____

_____

Evaluator's Comments: _____

_____

_____

_____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

Seed Selection
Unit 4

TEACHERS GUIDE

Objectives of Unit 4:

Upon completion of this unit, each student will be able to:

1. Identify the 5 most popular soybean varieties planted in this area.
2. List 4 reasons these varieties are popular.
3. Rank several soybean seed samples in order of value to the soybean grower.
4. Compute the cost of pure live seed.
5. Classify soybean seed.

Discussion Guide:

Using your community as a text can make your teaching vocational. This unit on seed selection can be taught using the people in your community as the source of information. Challenge your students to learn about seed selection in the same manner as your school districts' farmers do -- by talking to seed sales representatives, by reading college bulletins, and by trying a few acres on their farm.

Action Activities:

These student activities can be the heart of this unit. While class discussion is important, it does not bring new knowledge to your classroom. The suggested action activities will bring information to your class making for a real life learning atmosphere.

	Student(s) Assigned
1. Survey area farmers to determine variety planted.	_____
2. Demonstration of care of home grown seed. (Optional for areas appropriate).	_____
3. Tape interview with 3 seed salesmen.	_____
4. Bulletin board display on seed tags.	_____
5. Report on prices of soybean seed.	_____
6. Discuss yield bulletins.	_____

Suggested Time Schedule: 1 week (5 hours)
Some "action activities" should be assigned prior to teaching this unit.

Materials needed:

Sample seed tags	Local seed dealers
Plant flats or milk cartons	Homemade or greenhouse
12/64 slot hand screen	Elevator
State yield bulletin	Agricultural Extension Service

Transparency Notes:

BASF 4-1 Write the responses of your students beside the drawing. Try for 5-7 answers. Class participation is important, but if they don't know the popular soybean varieties, you may need to let them talk to their fathers.

After listing several varieties you can shift the discussion to the factors to consider when selecting soybean varieties. If you have a "text" (commercial sales bulletins) and want to assign some reading this may be the appropriate time.

BASF 4-2 Class response to this question may be very similar to the previous transparency. If so, ask them to rank them by how they would yield. Leave room to the right to list the yield from a state or county yield contest or college test.

It would also be appropriate to discuss the differences in yields between the popular varieties grown in your area. Are they significant? Does it matter which variety is planted?

BASF 4-3 Most serious soybean producers plant more than one variety. Why? Why not bring the best grower in your community to discuss this with your class. You may want to make a reading assignment which discusses maturity ratings of soybeans.

Ultimately you will narrow the information down to spreading the maturity dates so that the beans can be harvested at or near 13% moisture.

BASF 4-4 The variety of soybean planted is important, but other seed quality factors are also worth considering. Number one is probably germination and seedling vigor. Many farmers may feel this is more important than variety.

In the corn belt, most farmers will want to keep all corn seed out of the seed bag. Inert matter and weed seed are not generally a problem.

However, uniform size of seed will aid accurate planting. Since seed sells at a premium of 2-3 times that of commercial soybean seed, companies want their seed to look good when the bag is opened.

BASF 4-5 Ask a panel of farmers to visit class and they will tell you they want a good even stand when they raise soybeans. Skips and bunches have sold many planter monitors.

Top quality seed will give you the best seedling vigor. Use this transparency when your student talks about his experiment with cracked seed, green seed and small seed sizes.

Name _____

Seed Selection

1. Why would a farmer buy seed when he has soybean seed in his bin from last year?

Action activity: Survey 10-15 area farmers to determine where they obtain their seed for planting soybeans. Compile this information on a poster for the classroom.

2. Not everyone buys his seed beans. What precautions should you take prior to planting home grown seed?

Germination -

Cleaning -

Handling -

Action activity: Prepare and give a demonstration of the care of home grown seed. Include samples of materials screened from seed, germination tests and handling procedures. (Your elevator should have a set of hand screens.)

3. Seed sold for planting must meet governmental regulations for quality and purity. Which requirements are the most important to farmers?

Why is some seed called "certified" and other seed called "registered"?

Many companies sell their own variety of seed (Private). Others may only sell varieties developed by state or federal institutions (Public). Some may sell both. List some of the popular private and public varieties for this area.

Private	Public
a.	a.
b.	b.
c.	c.

Action activity: Tape an interview with one or two seed sales people discussing each of the three topics listed above. Submit your tape to a local radio station for use on a farm program.

4. Soybean seed is generally bagged and tagged. Why are seedsmen required to tag beans?

Action activity: Obtain the seed tags from popular varieties of soybeans. Prepare a large bulletin board explaining what kinds of information are found on the tags.

5. Cost of seed may determine where the seed is obtained by the local farmers. Discuss the price range you would expect soybean seed to command.

Action activity: Contact 3 or more seed dealers that sell seed beans in this school district. Obtain a price list for their seed. Report to class.

6. Land grant colleges and many local clubs conduct yield contests or distribute yield information to help farmers select the highest yield varieties. Why don't all farmers plant the variety that did the best in this area last year?

Action activity: Distribute state yield bulletins and lead a discussion and review of the results printed.

7. Select 3 varieties of soybeans you would plant. List them below. Determine the percentage of seed you would plant of each variety if you were to buy seed for a farm. Explain your reasons for the varieties you have chosen.

Varieties	%	Reasons
1.		
2.		
3.		

Name _____

LABORATORY EXERCISE

Objective: Upon completion of this laboratory exercise you will have demonstrated seedling vigor from several types of soybean seed.

Materials needed:
Seed flats

Evaluator _____
(Not vo-ag instructor)

Procedure:

Step 1 Collect 3-5 samples of "bin run" soybeans.

Step 2 Sort seed for different germination trials. Collect 25 or more green seeds, split seeds, seeds with loose seed coats, small seeds, large seeds, etc.

Step 3 Plant seed in flats or place in blotter paper and keep moist for one week.

Step 4 Describe the results in terms of what you would look for when buying seed.

Evaluator's Comments: _____

_____

_____

_____
Signed

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

TEACHERS GUIDE

Weed Control
Unit 5

Objectives of Unit 5:

Upon completion of this unit, each student will be able to:

1. Describe 3 ways weeds are controlled in soybeans.
2. Compare post emergence and pre-emergence herbicides.
3. Calibrate a sprayer, place the proper amount of herbicide in a sprayer, and order the correct amount of herbicide.
4. List 5 safety rules while using herbicide.

Discussion Guide:

Class discussion is important. Strive for an atmosphere of give and take - - a time when few comments are wrong and everyone's opinion count. The following 11 areas for discussion are practical and offer a chance to learn by "hearing" if you can thoroughly discuss each. Bring the action activities into play and your students can learn by "doing" also. Hearing and doing to learn are very important supplements to any reading that might be assigned.

Action Activities:

These suggested projects should add a new dimension to the learning in your classroom. The students can control much of learning if project approach is used. For example, they set how long they will take, how complete they are, and where the information will come from. Strive to be their partner in this learning experience, not the boss.

Action activities included for this unit are:

	Student(s) Assigned
1. Bulletin board on weed control	_____
2. Slide-tape program on pre-emergence weed control.	_____
3. Host film on secondary tillage	_____
4. Host farmer as speaker	_____
5. Flash cards on vocabulary	_____
6. Weed samples	_____
7. Moderate panel discussion	_____
8. Mobile on different types of sprayers	_____
9. Demonstrate spray tips	_____
10. Flannel graph on filling a sprayer	_____
11. Role play herbicide safety	_____
12. Demonstrate poor handling of herbicide	_____

FFA Activities:

Demonstration plots are a natural. Go easy on the idea your plot "proves" something. Better to stress that your weed control system worked and why.

A money raising activity could be to prepare weed maps and a tailored weed control plan for specific weed problems for area farmers for a fee. We are seeing more and more farmers hire scouts to tell them what is going on in their fields.

A community service project built around weed control could be to keep weeds down in difficult locations like under bleachers at the football field or at the fairgrounds. Other areas could be around landfills or buildings. Use your imagination.

Transparency Notes:

BASF 5-1 Ask a farmer what he doesn't like about soybeans, and weed control will be the answer every time. Your study in this unit should attack the problem head on - - weeds can be controlled in soybeans. but, don't give the impression that it is easy. Throughout this unit stress a system or program of weed control. There is no one thing to do to control weeds.

The first transparency illustrates the 3 parts of the system approach to weed control. They are tillage, herbicides, and the soybean canopy.

Each of these components of good weed control has seen rapid improvements in recent years. Write them on the transparency as your class discusses them. Tillage improvements, - field cultivators, rototillers, Danish tine cultivators, etc. Canopy improvements - narrow and solid seeded soybeans mean shading in 4 weeks, Herbicide improvements - post emergence grass control (Poast, Hoelon), post emergence broadleaf control (Basagran, Blazer).

BASF 5-2 Tillage is very important. As suggested on the transparency soybeans cannot overpower weeds. Tillage insures that there are no weeds present prior to planting. Correct tillage also incorporates preplant herbicides such as Basalin, Treflan, Lexone, Sencor, Prowl, Lasso, Dual, Amiben, etc.

Wheel tracks are a problem when using a drill. Tillage should remove the wheel tracks.

The most important part of tillage is to provide a good seed to soil contact at the correct depth. The best planter or drill cannot make up for poor tillage.

BASF 5-3 Some fields may appear so weedy that a map is unnecessary, but this is not true. Rare is the field that cannot be helped by identifying where specific weeds are a problem. Write in appropriate weed problems on the map.

You may also want to take some local slides to supplement this transparency.

Have data available from the Extension Service to match weed problem with most effective herbicide.

BASF 5-4 A sample program might look like this:

Basalin - Preplant 1 qt/a broadcast Basagran - post emerge 1 qt/a broadcast Poast - Spot spray 1 pt/a on peat soils	or	Lexone/Sencor - Preplant, ¾ pt./a broadcast Hoelon - Post emergence, 3 pts/ a broadcast Roundup - Spot spray volunteer corn

Visit with several farmers to find out their programs so you can be familiar with what is being applied on the fields in your school district.

BASF 5-5 A blueprint for action - - your game plan - - call it what you want, but stress the need to have a system to control weeds.

If you have an FFA Demonstration Plot, this can be an excellent process for your class to follow.

Another use is to prepare the sheet ahead of time but, put in entirely wrong information and ask your class to correct it.

Some teachers will use this as a quiz if desired.

BASF 5-6 There seem to be hundreds of terms that your class needs to know to "talk" farming today. This game can help.

Punch a hole in the transparency. Attach a cardboard or plastic circle with a pointer attached. Be sure spinner moves freely.

Rotate around your class, organize as a spell down, or make up other rules to have a game defining the terms. A few prizes will "encourage" your students to actively enter the game. Note the general understanding of the students.

Name _____

Weed Control

1. Weeds are the greatest production problem for the typical soybean producer. However, farmers are doing a better job of controlling weeds now than 10 years ago. They use three methods. Describe each.

   1. Tillage

   2. Herbicides

   3. Canopy

   Action activity: Prepare a bulletin board display showing how weeds are controlled by tillage, herbicides, and the soybean canopy.

2. Early weed control is most important since soybeans are poor competition with weeds. Much of our primary tillage activities are directed toward giving the soybean plant a head start. How does early or primary tillage help control weeds?

   Good seedbed

   Trash incorporation

   Chemical incorporation

   Weed removal

   Action activity: Prepare a slide-tape program showing how weed control is accomplished prior to planting. Use local shots and copies of magazine photos for your slides. Show your final production to your class.

3. Secondary tillage, tillage after planting, is also important in controlling weeds. Discuss how each of the following kill the weeds that are present.

Rotary Hoe

Cultivator

Hand Weeding

Action activity: Secure 3 or 4 films from equipment companies or from other film libraries on tillage. Screen each and select 5-10 minutes of the best footage on secondary tillage to show to your classmates. You may want to turn off the sound and do the narration yourself.

4. Post emergence herbicides are now one of the most important concepts in weed control. List the most important in your area. Which weeds are controlled by each?

a)

b)

c)

What type of equipment is used to apply post-emergence herbicides?

Action activity: Invite a farmer with experience in applying herbicides to control weeds in soybeans to talk to your class. Ask him to bring pump and nozzle samples to class. Prepare a list of 10-15 questions for him to use in preparation for his talk.

5. Why is it important for a farmer to be able to speak & read the "language" of the herbicide industry?

Action activity: Prepare a set of flash cards for the following terms: Pre-emergence, preplant incorporated, post emergence, cracking treatment, surface blending, post directed sprays, dry flowable, emulsified concentrate, wettable powder, granular, banding, tank mix, broadcast, compatability, contact herbicide, residual herbicide, systemic herbicide, broadleaf, rhizome, annual and perennial.

6. The first step in using a herbicide is to determine the problem weeds to be controlled. Which weeds are problems in this area?

Broadleaf

Grasses

Action activity: Collect weed samples and dry them between newspapers. Mount on white cardboard and cover with clear plastic. Label with name and common control measures.

7. How can a farmer match the weed types to be controlled with herbicide to be used?

Soil - - texture

Soil - - % organic matter

Stage of growth

Crop -

Weed -

Rotation

Application methods

Label restrictions

Action activity: Serve as moderator of a panel discussion. Invite 2-3 farmers and a representative of a chemical company and your vo-ag instructor to be on the panel. Discuss question 7.

8. How many types of sprayers can you list?

Action activity: Prepare a mobile illustrating the different types of sprayers.

9. Draw the spray pattern of the common spray tips.

Flood Fan Hollow Cone Cone

Why not use a flood jet with a contact herbicide such as Basagran, Paraquat, Round-up, or Hoelon?

Action activity: Collect samples of each tip and assemble them on a boom to show your classmates the pattern from each. (Use plain water). Also find used tips and collect samples from each tip to illustrate changes in pattern and amount of water that flows through a worn tip.

10. A farmer wants to (A) buy the correct amount of herbicide and he needs to know (B) how much to put in his sprayer. Obtain an example from an area farmer and work out the amounts below.

A. Size of field _____

Herbicide used _____

Herbicide Rate/Acre _____
(Label)

Amount to purchase _____

B. Amount of water recommended/acre _____ gal.
(Label)

Amount of pressure recommended _____ #
(Label)

How many acres per tank are sprayed? _____ a
$\frac{\text{tank size}}{\text{gal/a sprayed}}$

How much herbicide should be applied/acre? _____

How much herbicide should you put in the tank? _____
(acres sprayed x herbicide/acre)

Action activity: Prepare a flannel graph presentation showing how much chemical to buy and how much to put in the tank.

11. Herbicides are designed to control weeds and must be handled carefully. List 5 safety rules to follow when applying chemicals.

1.

2.

3.

4.

5.

Action activity: Role play the safe use of herbicides. Cover storage, mixing, application, and clean up.

12. Herbicides don't always work. Why don't they?

1.

2.

3.

4.

5.

6.

7.

8.

Action activity: Set up a small demonstration plot in your greenhouse or even classroom window showing why some herbicides don't work.

Name _____

Date _____

LABORATORY EXERCISE

Objective: Upon completion of this activity you will be able to check the accuracy of and make adjustments to a sprayer under field conditions.

Evaluator _____
(not vo-ag instructor)

Materials needed:

Sprayer and tractor	Calculator
Label from herbicide	Small Tool Box
Tape measure	Stop Watch

Step 1 Complete recommended safety and maintenance checks on the sprayer and tractor.

Step 2 Install tips, screens, valves, etc. that may have been removed for storage.

Step 3 Set boom height. _____ inches from ground

Step 4 Set pressure at operating pressure (_____) and collect a sample from each nozzle. Replace any nozzle which is more that 10% off.

Step 5 Measure effective width of sprayer and determine time to cover one acre.

Width _____ Ft. Speed _____

$$\frac{\text{Min}}{\text{acre}} = \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{\text{speed (mi)}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{43{,}560 \text{ ft ft}}{1 \text{ a}} \times \frac{1}{\text{width in ft}}$$

Step 6 Determine gallons per minute applied. _____ gal/min. (Collect spray from one nozzle for 1 min. and multiply by number of nozzles.)

Step 7 Compute application rate:_____ gallons/acre
(min/acre x gal/min = gal/acre)

Step 8 Change application rate to reach desired application rate:

Pressure _____ higher _____ lower _____ same

Speed _____ higher _____ slower _____ same

Spray tips _____

Evaluator's comments: _____

_____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

Planting Soybeans
Unit 6

TEACHERS GUIDE

Objectives of Unit 6:

Upon completion of this unit, each student will be able to:

1. Talk for five minutes describing soybean planting trends.
2. Calibrate a planter and a drill.
3. Adjust planting rates for seed quality.
4. Determine if a planter, soybean special, or drill is most economical tool to plant soybeans.

Discussion Guide:

Planting is important - - one of the key steps in profitable soybean production. This unit on planting then becomes very important. The material will need to be adjusted to fit your local customs, soil type, growing seasons, and rotations used. The discussion guide will still provide an excellent set of notes however.

Action Activities:

These suggested student learning activities will need your supervision and guidance. As your class members complete the individual activities however, any reading assignments you may have given will become more meaningful. Activities included for this unit are:

	Student(s) Assigned
1. Guest speaker describing planting trends.	_____
2. Bulletin board display on herbicide program.	_____
3. Magazine articles on seeding rates.	_____
4. Radio tape on planting rates.	_____
5. News article stressing planting on time.	_____
6. Slide series comparing planters and drills.	_____
7. Calibrate a planter and a drill.	_____

Suggested Time Schedule: 1-2 weeks (5-10 hours)

Some activities will need advance planning. Check with local machinery dealers early so that planting equipment can be brought into the shop. Any films will need to be ordered in advance also.

Transparency Notes:

BASF 6-1 For years soybeans were a second crop to most farmers, but not now. Today's farmer is looking at soybeans as an equal partner with his other crops. This will be evident when your class explores the trends in soybean planting systems.

This transparency will help define several planting terms that they will find in their reading assignments and during class discussions.

BASF 6-2, 3 Many different planting alternatives are available, and you can challenge your class to find which it feels is best. Color of paint and following Dad are the two most common methods used by high school students to select machinery. Common, but not sound.

These two transparencies approach the problem from economics. Note that the acreage containing more than 600 acres of soybeans is assuming that more than one planting crew is being used.

BASF 6-3 The extra yield from narrow or solid seeded soybeans is not all profit. This transparency is designed to identify those expenses. Lead the class discussion toward the following understandings: (a) More expense means more risk, especially for the young farmer. (b) Farming requires a manager - - one willing to figure the cost and returns. (c) Added net profit comes in small amounts.

BASF 6-4 An open discussion transparency. Adapt to your class situation. Timing is very critical for double crop soybeans and is also important in the northern soybean belt.
Jot down appropriate specifics such as:

a. Don't plant unless soil temperature is rising.
b. Bean emergence is slow in cold weather, favors weeds.
c. Soybean yields decline less than corn from late planting.
d. Beans should be planted in moisture or when rain is expected.

BASF 6-5 Weed control is the key to profitable soybean production. Herbicides have made it possible to narrow the plant spacing and in many cases eliminate cultivation and hand weeding.

Early planting used to mean weeds, but not any more. Your class may want to set up demonstration plots in your community to encourage early planting.

Name _____

Planting Soybeans

1. Describe the planting trends in your community.

	Sixties	Eighties	Future
Row widths	_____	_____	_____
Time of planting	_____	_____	_____
Planting unit	_____	_____	_____
Type of seed	_____	_____	_____

Action activity: Invite an experienced soybean producer to visit your class and discuss soybean planting trends.

2. Why are planting practices changing?

Action activity: Prepare a bulletin board display illustrating the herbicides we have available to control weed problems in soybeans.

3. Which seeding rates fit the needs of farmers in this area?
Describe at least three situations.

1.

2.

3.

Action activity: Secure an appropriate copy of the Soybean Digest or other recent publication and review stories on planting rates at different row spacing. Duplicate the portion of the story discussing planting rates for your classmates.

4. Why is the germination percentage printed on the seed tag important when setting the planting rate on a planter or drill?
Give an example:

Action activity: Tape an interview with your county extension director, vo-ag instructor, or other expert on planting rates for your area. Play the tape during a class and submit to a local farm radio station.

5. When should soybeans be planted in this area?

What type of yield reduction would you expect if soybeans are not planted at the correct time?

Action activity: Write a news article on the importance of planting beans on time. Take an appropriate picture of a local farmer's planting equipment and submit the story and photo to a paper for publication.

6. Which is better - a planter or a drill?

Why?

Action activity: Using a camera equipped with a close-up lens, prepare a slide series from company brochures and sales brochures on planters and drills. Show slides to your class.

7. Describe how you would calibrate a planter and a drill.

Action activity: Bring a planter and a drill into your ag mechanics laboratory and demonstrate calibrating the two machines.

Name _____

Date _____

LABORATORY EXERCISE

Objective: Upon completion of this activity you will be able to adjust the planter for field conditions.

Evaluator _____
(not vo-ag instructor)

Materials needed:
Planter or drill
Operator's Manual
Seed tag

Procedure:

Step 1 Review the operator's manual for the planter being used. Also review carefully the seed tag.

Step 2 Determine depth beans are to be planted. Follow operator's manual and set planter.

Step 3 Determine seeds per foot desired _____. Follow operator's manual and set planter.

Step 4 Operate planter at normal planting speed. _____ mph.

Step 5 Dig up seed several places and determine results.

Actual depth planted _____ in.

Actual seeds planted _____ ft.

Step 6 Repeat process until you are satisfied with results.

Ask evaluator to review the operation of the planter and give his comments below:_____

_____

_____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

Trouble Shooting
Unit 7

TEACHER'S GUIDE

Objectives of Unit 7

Upon completion of this unit, each student will be able to:

1. Identify 10 potential problems that may reduce yields and profits.
2. Associate a cure, treatment, or preventative with the soybean problems in this area.
3. Use labels or bulletins to prepare a specific reaction to soybean troubles.

Discussion Guide:

You will need to localize this unit with references and material commonly available to farmers in your area. If you use action activities for your students you can build a library of local material to enrich class discussions and reading assignments.

If your vo-ag department has access to a deep freeze unit, to freeze plant samples in plastic bags for students use out of season.

Action Activities:

All high school students will not possess enthusiasm to learn the technical language, the specific chemical names and rates, or even the names of 4 different kinds of nematodes or some 50 soybean diseases.

The best approach to this unit is to let the student with your guidance learn a small part of this unit through the problem solving process.

Local farmers and your students should strive for a general understanding of soybean problems and then be able to meet local challenges.

Action activities should allow your class to learn the basics and become problem solvers.

Specific action activities suggested for this unit are:

	Student(s) Assigned
1. Bulletin board on soybean problems.	_____
2. Paper on problem and cure.	_____
3. Survey of farmers soybean problems.	_____
4. Slide series on insect pests.	_____
5. Collect samples of soybean diseases	_____
6. Host guest speaker on trouble shooting.	_____
7. Display of soybean growth stages	_____

FFA Activities:

Demonstration Plots - -

Demonstration plots might be appropriate here, but most troubles that show up while raising soybeans are not planned.

Be flexible. If a problem shows up in your demonstration plot, react like a farmer would. Keep good records and publicize your results.

Community Service - -

How many times have you heard farmers say, "I didn't know that was what it's called"? Help your area farmers learn the correct names by labeling problems that show up. Keep in mind most newspaper staff people would welcome working with some of your students to do a series on soybean problems each summer.

Time Schedule: 1 week (5 hours)
Some action activities should be assigned prior to starting this unit. Specifically #3, #4, and #5.

Transparency Notes:

BASF 7-1 Soybean production isn't always easy. As more and more acres of this crop are grown, more problems are showing up.

Also, a farmer with only a small percentage of his crop in soybeans doesn't get too excited about an insect or disease problem on a portion of the soybean acres. But, many farmers have one half of their land planted to soybeans - - some even more.

A study of soybean production would be lacking if some time wasn't spent learning how to solve soybean problems.

BASF 7-2 Trouble shooting soybean problems is really a judgment call. Most solutions to a soybean production problem involve spending money to keep the yield from being reduced.

Watch out during this unit that you don't encourage and reward the student that learns hundreds of facts. Trouble shooting uses some facts, but the profitable soybean grower knows how to gather data, make a decision and then carry out the decision. Many of these facts do not need to be memorized - - your farmers and students need to know how to use a vast ocean of ever changing data.

BASF 7-3 Basic knowledge needed when growing soybeans is to know the stages of growth. Herbicide labels, bulletins, and the news media talk in terms of cotyledon stage, the first trifoliate stage, etc. This transparency can be a guide, but bring some plants in from the field or the school greenhouse if you can.

BASF 7-4 As your students mention specific insects write the name in the blank. Then place a P for prevention or a T for treatment in the small blank.

Some teachers will duplicate this transparency for their student's notes and use it in class as a worksheet.

The next step after this transparency is to be specific about the prevetion and, or, treatment. Try to include cost of and compare with the current bean price. We would recommend listing treatment cost in bushels of beans. For example, foxtail can be controlled with Basalin at a cost of 1-1.5 bu/a.

Name _____

Trouble Shooting Soybean Problems

1. Soybeans "talk" to their owner if the owner listens and if he understands what the plant is saying. The soybean plant will tell if problems exist from insects, diseases, nematodes, herbicide damage, or nutrient deficiencies. Rank these potential problems in order of importance for this area.

Action activity: Prepare a bulletin board display on one of the potential soybean problems listed above.

2. Almost all fields show some evidence of insect and disease damage. Many will commonly show some herbicide damage and might show nutrient deficiency. But, how do you tell if the problem is reducing yield more than the treatment would cost?

Action activity: Write a paper about one of the problems we may have when growing soybeans. Include the cost of the cure, and how many bushels of beans would be needed to pay for the cure.

3. The value of soybeans per bushel may influence how much a farmer will spend to prevent or cure a problem. What evidence do you see in your school district that farmers are preventing or curing soybean problems?

Action activity: Survey 10-15 farmers to determine what problems they have identified in their soybean fields and how they are solving these problems.

4. What are the most common insect pests on soybeans?

Action activity: Prepare a slide series showing common insect pests and the damage they cause. A close-up lens and a copy stand will allow you to use photos from magazines and bulletins.

5. List the worst soybean diseases.

Action activity: Collect samples of soybean leaves, stems, roots and seeds which are infected with a plant disease.

6. Soybean problems can be prevented or treated in a variety of ways. Select 2 or 3 soybean troubles and discuss the use of the following techniques to reduce economic loss. (Pesticides, mechanical, rotation, and variety.)

Action activity: Secure a guest speaker to visit your class and discuss trouble shooting problems that develop while raising soybeans.

7. Many pesticide labels and extension bulletins refer to the different stages of growth in the lifespan of a soybean. Sketch the different stages of growth below.

Action activity: Prepare a bulletin board display of the different stages of growth for soybeans. Label each.

Trouble Shooting Soybeans
Unit 7

Name _____

Date _____

LABORATORY EXERCISE

Objective: Upon completion of this activity you will be able to scout a soybean field to analyze the problem found.

Evaluator _____
(not vo-ag instructor)

Materials needed:

Soybean field
Field map
Knife
Small shovel
Plastic sample bags
Camera
Bug drop cloth

Procedure:

Step 1 Review bulletins and text books to become familiar with the symptoms of herbicide damage, nutrient deficiency, insect damage, and soybean diseases.

Step 2 Walk the field looking carefully at the plants. Follow an irregular pattern.

Step 3 Plants that are not normal should be inspected carefully. Note the size of the area affected. If more than 5% is showing abnormality treatment may be needed.

Step 4 Damaged plants should be dug up so that the roots can be inspected. Using a knife, split the stem so that general health of the plant can be checked.

Step 5 Write your findings for the field.

_____

_____

_____

Step 6 Suggested remedies or treatments.

_____

_____

_____

Evaluator's Comments: _____

_____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

Double Cropping
Unit 8

TEACHERS GUIDE

Objectives of Unit 8:

Upon completion of this unit, each student will be able to:

1. Determine if double cropping pays.
2. Describe at least 3 tillage systems for double cropping.
3. Prescribe a herbicide program for double cropping.
4. List the seeding rates, appropriate varieties, and planting deadlines for his area.

Discussion Guide:

Prepare yourself for question one by having custom rates and some guidelines for yields readily available for your class. It is very important that your class feels double cropping pays if they are to apply themselves to the remainder of the unit.

Your community is one of the best sources of information for this unit. Keep your instruction vocational by using the community resources available.

Action Activity:

Student(s) Assigned

1. Guest speaker on double cropping. _____
2. News story on yield test bulletin. _____
3. Field trip to see equipment and field. _____
4. Slides on spraying. _____
5. Taped interview with farmers for radio. _____

Transparency Notes:

BASF 8-1 The economics of double cropping soybeans needs to be checked for each farm. Not all new practices are for everyone. Use this transparency to compare the expenses and additional income. Then decide if double cropping is for you.

BASF 8-2 Double cropping soybeans after wheat is gaining popularity. Expecially no-till systems or other tillage operations to save fuel, labor, and the soil. Discuss the different systems and figure the costs using each. Several of the action activities will be appropriate with this transparency.

BASF 8-3 Double cropping still requires top management. In fact, it requires an even higher degree of management. A good stand is a must and time is valuable as the "window" for planting the second crop is small.

Encourage your students to see that many soybean production points are the same. For example: weed control, good stand, early planting, etc.

Suggested Time Schedule 1 week (5 hours)

Name _____

Doublecropping

1. Raising one more crop each year is a reality in much of the southern soybean belt. The number of acres double cropped each year is growing. The key is increased profit per acre. Will double cropping pay?

Additional Income

Yield/a _____

Price/bu $_____

Income/a $_____

Additional Expense

Seed/a $_____

Fertilizer/a $_____

Herbicide $_____

Machinery $_____

Labor $_____

Misc. $_____

Total $_____

NET INCOME FROM DOUBLE CROPPING $_____

Action activity: Invite an aggressive young farmer to class to talk about double cropping. Work with him in preparing an outline of his talk.

2. Which variety of soybeans will yield the best in this area? What seeding rate do you recommend?

Action activity: Obtain yield test information for your area and prepare a news article based on the results. Be sure that you stress significant yield differences in selecting those varieties which yield the best.

3. There are a variety of tillage systems to choose from when double cropping. List the best system first, second best second, and explain each. (No till, interseeded, minimum till and conventional.)

   1.

   2.

   3.

   4.

Action activity: Plan a field trip to a farmer's double-crop soybean field. Also look at his equipment and note the condition of the soil.

4. Which herbicides are used when double cropping?

   Contact

   Residual

Action activity: Prepare a slide series showing the equipment, calibration, and results of applying herbicides so that you can double crop soybeans.

5. Planting soybeans in a double crop system relies upon moisture and correct planting dates. How can a farmer insure that he is planting the second crop on time and in moisture so that the soybeans will grow?

Action activity: Tape an interview with a farmer that has double cropped soybeans successfully for several years. Submit your tape to a local farm radio station for their comments and possible use.

Name _____

Date _____

LABORATORY EXERCISE

Objective: Upon completion of this activity you will be able to describe in detail the extent of double crop soybeans in your school district.

Materials needed:
Note pad and pencil
Plat book
Transportation

Evaluator _____
(not vo-ag instructor)

Step 1 Review definition of double cropping and how to tell double cropped land at this time of year.

Step 2 Define area (county, school district, townships, sections, etc.)

_____

_____

_____

Step 3 Draw boundaries on plat book.

Step 4 Color or shade those fields being double cropped.

Step 5 Summarize results and post maps on classroom wall.

Evaluator's Comments: _____

_____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

Areas needing improvement:

_____

_____

_____

TEACHERS GUIDE

Objectives of Unit 9

Upon completion of this unit, each student will be able to:

1. List 5 steps to complete prior to harvest
2. Calculate the cost of harvest losses
3. Adjust combine to reduce losses
4. Handle harvested crops until marketed.

Discussion Guide:

Carefully worded questions develop pictures in your student's minds - - pictures or images that can remain for days or even years. While reading and listening are not very effective ways to learn, learning and thinking are inseparable.

We have suggested questions for your class to discuss in this discussion guide. Feel free to revise them to make them local or more appropriate for your students. (Easier to visualize in their minds.)

The "action activities" can also help develop concepts and opinions. They add life to your class activities.

FFA Activities:

Many FFA activities can be organized around harvest. Safety campaigns are traditional. SMV signs and lighting can be improved in every community.

Pre-harvest combine checks would make an interesting activity for your chapter. They could also check for field losses.

Specific demonstrations in preventing field losses could be very beneficial. They could be repeated at farmer meetings, 4-H Club meetings, etc.

Suggested Time Schedule:
Chapter Nine - 1-2 weeks (5-10 hours)
Certain "action activities" should be assigned early, specifically #1.

Equipment and Materials needed:
Moisture tester
Overhead projector
Bulletin board material
FMO Combine Harvesting John Deere, Moline, IL
Operator's Manual
School Bus

Transparency Notes:

BASF 9-1 Valuable time is lost every year when the soybean crop is standing in the field and the farmer is home fixing his truck. Develop a checklist of items to complete prior to harvest. List should include cleaning bins, checking tires, greasing all machines, testing grain spreaders, fans, combines, etc.

BASF 9-2 Operating a $100,000 combine requires the operators full attention. Almost anyone can drive a combine. Only those who are willing to read and follow the operator's manual should be allowed to operate the machine.

BASF 9-3 The successful farmer listens to his soybeans and he knows their language. What's more, he corrects the complaints to keep soybean losses in the field to a minimum. Why spend a whole year raising a crop and then reduce your pay by being in too big of a hurry to do it right?

BASF 9-4 The handling of soybeans should not delay the combine in a well managed operation. Four basic options are available.

1. Start early (15-18%) and dry the soybeans to 13% with air or low amounts of heat.
2. Wait until beans approach 13% and harvest and store on the farm. Sometimes harvest will stop if beans become too dry. (8-10%).
3. Harvest at 15-18% and haul to commercial storage in town. Pay to dry or take a dock in price for water in grain.
4. Wait till beans are 13% and haul to commercial storage.

Action Activities:

(The community or the real world must be in your classroom if your course is to be vocational.) Learning by doing will keep your course from being dominated by reading. While some action activities require reading, (assign to good readers) many allow a student to learn and demonstrate learning with a minimum of reading skills.

Action activities included in this unit are:

	Student(s) Assigned
1. Slide series on harvest delays	
2. Moisture tester	
3. Collection of beans	
4. Field trip to check behind combines	
5. Bar graph showing field losses	
6. Bulletin board on new combines	
7. Role play field loss calculations	
8. Mobile of dull cutterbar sections	
9. Guest speaker on soybean storage	

Harvest

Name _____

1. Preparation for harvest is almost as important as harvest itself. Planning for harvest includes many steps such as:

   1.

   2.

   3.

   4.

Action activity: Prepare a slide series depicting harvest delays in the making. These are obvious problems that should be solved prior to harvest. (Broken elevators, flat tires on wagons, etc.) Show your slides to class for their comments.

2. Moisture content of the soybean is critical in determining when to start harvest. How can you tell when beans are ready to combine?

Action activity: Obtain a farm moisture tester and demonstrate how it works. Prepare a chart showing typical dry down rates and common soybean varieties and their maturity on a given day. Also check moisture content at top of plant vs. bottom of plant and moisture content from beans on top of a hill vs. the beans in the ponds.

3. Harvest rarely starts and continues on to completion without stopping. Generally, rains, differences in varieties, etc., force an operator to start and stop his harvest. Describe how a combine operator can tell when to combine and when to stay out of the field.

Action activity: Collect samples of beans which are too wet, too dry, full of green weed seed, etc. which might force an operator to stop harvest.

4. Harvest losses can reduce a farmer's profits. Yet few operators can place all of the beans in the bins. How would you determine when too many beans are being left in the field?

Action activity: Arrange a field trip to check the fields behind combines during soybean harvest. Accurately measure losses. Compile your results.

5. Why is a bushel (1/50th of yield) of soybeans left in field a bigger problem than it might first appear?

Action activity: Prepare a bulletin board showing a bar graph of the field losses versus profit bushels in a typical soybean field.

6. Field losses must be identified to be reduced. Where do field losses occur?

Location	Why
1.	
2.	
3.	
4.	

Action activity: Develop a bulletin board showing various brands of combines stressing how they reduce field losses.

7. How can you measure field losses so they may be reduced? Give an example.

Action activity: Set up a role play situation showing "Speedy McQueen" harvesting (measure his losses) and "Camero Owner Jack" (measure his small losses). Work the math on the chalk board.

8. Describe the maintenance needed to keep field losses to a minimum.

Action activity: Make a mobile of "bean robbers" or dull and damaged cutterbar sections. Visit several farmers to obtain the sections.

9. A part of harvest planning necessary to speed harvest operations is storage. Compare the alternatives to use to store soybeans. List the most popular first.

Action activity: Invite a guest speaker to your class to describe and answer questions about his soybean storage program. Select a farmer who uses a variety of storage methods.

Name _____

Date _____

LABORATORY EXERCISE #1

Objective: Upon completion of this activity you will be able to determine combine efficiency and make adjustments to reduce soybean losses.

Material needed:
Combine
Operator's Manual
FMO Manual from John Deere
Measuring tape (4 beans/sq. ft. equal 1 bu./a.)

Evaluator _____
(not vo-ag instructor)

Procedure:

Step 1 Review operator's manual and FMO text on combine losses. Disengage straw spreader.

Step 2 Select a typical spot in the field. Combine at least 100 yds. and stop progress of machine and shut off cutterbar and reel. Back machine up at least length of machine. Shut off engine.

Step 3 Count beans lost in standing beans to determine field losses prior to harvest. Preharvest losses were _____ bu/a (Good goal is none).

Step 4 Gathering unit losses are measured under the combine where it stopped the farmers progress. These losses are from the cutterbar or reel. These losses measured _____ bu/a. (Good goal is ½ bu/a).

Step 5 Rotor or cylinder losses are measured by counting beans in the pods which travel through the machine. Be sure to allow for the width of the head when computing the losses. Select pods from discharge. Rotor losses were _____ bu/a. (Good goal is none).

Step 6 Separation loss is the beans threshed by the rotor, but they traveled out of the machine. Count threshed beans, subtract pre-harvest losses and you have separation loss. Bu/a _____ (Good goal is none).

Step 7 Total loss was_____

Step 8 Adjust machine; check losses again. Total harvest loss_____

Step 9 Adjust machine; check losses again. Total harvest loss_____

What do you feel are acceptable losses?

_____

_____

Are you satisfied with the way you adjusted the combine? Yes No Why?

_____

_____

Evaluator's Comments:_____

_____

TEACHING RECORD:

Date(s) unit taught: _____

_____

_____

Teacher comments on effectiveness of unit _____

_____

_____

_____

Number of people in class _____

Resource people in community:

Name	Company or firm location
_____	_____
_____	_____
_____	_____

Films used:

Name	Source	Rating
_____	_____	_____
_____	_____	_____
_____	_____	_____

Most successful learning activities:

_____

_____

_____

60

Areas needing improvement:

_____

_____

_____

THE AMERICAN SOYBEAN ASSOCIATION

The Soybean Association is a farmer-controlled, farmer-financed single commodity organization aimed at increasing profits for soybean farmers.

Farmers control the Soybean Association at both the state and national levels. Members elect farmer directors to establish and direct programs that are in the best interest of soybean farmers. Soybean farmers, serving as delegates at annual meetings, establish state and national policies.

This membership and policy side of the Association is separate from the soybean checkoff. Farmers are elected or appointed to state checkoff promotion boards which are responsible for determining how to best use soybean checkoff funds for export development, research and education programs to build farmer profits.

The Soybean Association offers the following programs/services:

- Promotes U.S. soybeans throughout the world;
- Conducts programs to expand overseas soybean sales;
- Sponsors research on new products;
- Sponsors production research to reduce costs/develop management practices;
- Provides members an exclusive, weekly soybean market newsletter, SOYBEAN UPDATE;
- Sponsors production conferences and marketing seminars;
- Provides fellowship and information through annual meetings and the national SOYBEAN EXPO;
- Lobbies in Washington and around the world for government policies that boost soybean profits; and
- Provides current management information through the SOYBEAN DIGEST MAGAZINE.

The World Headquarters of the American Soybean Association is:

Box 27300
777 Craig Road
St. Louis, MO 63141
314/432-1600

Overseas offices are located in: Tokyo, Hamburg, Taipei, Brussels, Mexico City, Vienna, Madrid, Seoul and Singapore.

A Note From BASF Wyandotte Corporation

Some folks think things just grow.

As a member of the agricultural community, you, of all people, know better.

A good crop is the result of care and expertise and skillful management. At BASF Wyandotte Corporation we believe the same is true of a good company. But we also know there is no substitute for experience. That's why we take special pride in the more than one hundred years of accomplishments upon which BASF Wyandotte Corporation is built.

Since the merger in 1970 of BASF Corporation and Wyandotte Chemicals Corporation, one of America's most respected chemical producers, BASF Wyandotte Corporation has brough to the agricultural field an extensive background in the research and developments of a broad range of products.

For the BASF Group, whose agricultural chemical products have been known throughout the world for many years, participation in the American market has resulted in further expansion of research and production of new chemicals for agriculture.

As the developer and marketer of a wide variety of high performance pesticides, BASF plays an important role in the world's vital struggle to produce high yielding, high quality, food and fiber crops. And now, after the successful introduction of such well known products as Basagran®, Basalin®, and Pyramin®, herbicides, and Pix® cotton plant regulator, BASF Wyandotte Corporation ranks high among U.S. agricultural chemical producers.

At the same time, BASF Wyandotte's commitment to the needs of American agriculture is firmly established and backed by a network of highly trained and motivated people in research, market development, sales and management. These people make up the Agricultural Chemical Division · · part of the 6,000 people employed by BASF Wyandotte Corporation.

For BASF Wyandotte Corporation, and the millions who benefit from our products, the future is indeed promising. New herbicides, and insecticides are in various stages of development. The eventual addition of these new products to its present product line will enable BASF Wyandotte to serve even more fully the needs of agribusiness and the American people.

Technical Information Bulletin 8201

BASF
Agricultural Chemicals

Solid Seeding Soybeans (10" Rows or Less)

This bulletin contains some general guidelines for solid seeding soybeans in a non-cultivated culture of 10" rows or less. These guidelines are essentially a summary of experience and data gathered over the years from BASF/farmer trials, university research and farmer experiences.

These guidelines should be evaluated for the specific conditions which exist on a particular farm or field. Farmers solid seeding for the first time should proceed cautiously, evaluating the different variables under their own conditions.

I. Field Selection

Most geographical areas and soil types have shown positive yield responses to solid seeding, however, the greatest *percent* responses have occurred generally under conditions which tend to reduce plant growth and often result in the beans not fully canopying in the conventional wide rows. Some examples are late planting, shorter growing season in the Northern soybean zone, dry conditions and less productive or lighter soils.

The highest yield increases in bu/acre have come from solid seeding in a high yield environment (good drainage, high fertility and water holding capacity).

Also, select the fields with the lowest weed infestations when beginning to solid seed. As confidence is gained in the weed control program proceed to the weedier fields.

Erosion Control — If soil erosion is a problem, solid seeded soybeans can reduce erosion better than most tillage practices.

II. Soil Preparation

Proper soil preparation is probably more critical for solid seeding than for conventional wide row cultures. The available solid seeding soybean drills generally cannot compensate for poorly prepared seedbeds as well as conventional planters. Conventional primary tillage or conservation tillage, even though some trash is left on the surface, are both compatible with solid seeding soybeans.

Two secondary tillage operations are generally required to prepare the seedbed and properly incorporate the grass herbicide prior to planting. The final tillage device can be coupled between the tractor and the drill to eliminate wheel tracks. Several companies are offering equipment for tillage and planting in one operation. Whatever system is used, it is important to properly incorporate a grass herbicide and to seed at a uniform depth.

III. Variety Selection

Be cautious of just selecting your favorite wide row variety for solid seeding, because the adaptability to the two cultures often differs considerably. The following is a list of the five most important factors, in relative order of importance, for selecting a solid seeded variety:

1) High yield potential
2) Good lodging resistance
3) Rapid/strong emergence
4) Good early vigor
5) Good tolerance to problem diseases.

Fortunately, many new varieties are strong in several of the above categories. Consult your local university, seed supplier or BASF representative for varietal information for your area.

BASF Wyandotte Corporation, Agricultural Chemicals Division, 100 Cherry Hill Road, Parsippany, New Jersey 07054

IV. Fertilization

The crop will generally require more nutrients due to the usually higher plant populations and increased yield potential.

Since it is a relatively new practice there are very limited data available on fertilizer requirements for solid seeded soybeans. Consult university or local fertilizer dealer for additional fertilizer needs.

V. Seeding Rate

Generally, the seeding rate of a given variety should be increased by 20-25% over the ideal in conventional wide rows. The primary reason for increasing the seeding rate in solid seeded is to compensate for potentially greater stand losses due to crusting, rotary hoeing and less uniform planting depth. The second reason is that a full and uniform stand, in conjunction with herbicides, is necessary to obtain season long weed control. The solid seeding culture can generally tolerate a 20-25% higher population without adverse yield effects.

Be cautious of overseeding a variety that is particularly susceptible to lodging. Avoid overseeding on droughty soils or in areas which normally receive low in-season rainfall. Solid seeded soybeans reduce soil evaporation; however, over-population can increase plant transpiration beyond the saving effect of the soil evaporation, resulting in increased drought stress during the pod filling period.

The ideal seeding rate varies considerably between different varieties and conditions, thus specific seeding rate recommendations are impossible. The following general guidelines may be helpful when solid seeding for the first time:

1. Use 175,000 viable seeds per acre for a base.
2. Add 10% if planting very early or late.
3. Add 10% if planting a short or thin line variety. (30 to 40% for semi-dwarfs like Gnome and Elf.)
4. Add 10% if planting in a poor seedbed.
5. Subtract 10% if planting a tall bush-type variety.
6. Subtract 10% if planting in deep fertile soil where lodging is generally a problem.
7. Subtract 10% if planting in ideal conditions for the area, i.e. planting date, seedbed condition, soil moisture and temperature.

The percent germination and the seeds per pound should be considered when determining the seeding rate. Use Table I to determine the seeding rate in pounds per acre if both of these factors are available. Table II should be used to determine the seeding rate in seeds per foot of row if seeds per pound are not available. Table II can also be used to calculate stand after emergence (see Section VIII).

TABLE I — Seeding Rate Based on Lbs. of Seed Per Acre

	Desired Viable Seeds/Acre				
Seeds/Pound	125,000	150,000	175,000	200,000	250,000
2,000	63	75	88	100	125
2,100	60	71	84	95	120
2,200	57	68	80	91	114
2,300	54	65	76	87	109
2,400	52	63	73	83	104
2,500	50	60	70	80	100
2,600	48	58	67	77	96
2,700	46	56	65	74	92
2,800	45	54	63	71	89
2,900	43	52	60	69	86
3,000	42	50	58	67	83
3,100	40	48	56	65	80
3,200	39	46	54	63	78
3,300	38	45	52	61	76
3,400	37	44	51	59	74
3,500	36	43	50	57	72

To compensate for germination use the following formula:

$$\frac{\text{Desired lbs/Acre}}{\text{\% Germination}} = \text{Actual lbs/Acre Required.}$$

Example: $\frac{\text{65 lbs/A desired}}{\text{90\% germination}} = \frac{65}{.9}$ = 72 lbs/A required

TABLE II — Seeding Rate (or Stand) Based on Average Seeds (or Plants) Per Foot of Row

	Desired Viable Seeds (or Plants) Per Acre				
Row Spacing	125,000	150,000	175,000	200,000	250,000
*30"	7.2	8.7	9.9	11.4	14.4
10"	2.4	**2.9	3.3	3.8	4.8
9"	2.2	2.6	3.0	3.4	4.4
8"	1.9	2.3	2.7	3.1	3.8
7"	1.7	2.0	2.3	2.7	3.4
6"	1.4	1.7	2.0	2.2	2.8

*Solid seeding row spacing is 10" or less. The 30" row spacing is included for comparative purposes only.

**Example — If you aim for 150,000 plants per acre in 10" rows, you need 2.9 seeds/plants per foot of row compared to 2.0 in 7" rows. To compensate for germination use the following formula:

$$\frac{\text{Desired seeds/foot}}{\text{\% Germination}} = \text{required seeds/foot}$$

Example:

$\frac{\text{2.7 Seeds/foot desired}}{\text{90\% germination}} = \frac{2.7}{.9}$ = 3.0 seed per foot required

VI. Planting

Row Width: The best response to narrowing soybean spacing has come from non-cultivated 10" rows or less. Yield potential, economics, weed control, harvesting efficiency, soil conservation, moisture conservation and losses are all factors which must be considered.

Equipment: Equipment manufacturers have responded rapidly to the increasing interest in solid seeding. Several new drills with new or improved options have been developed specifically for soybean seeding in narrow rows.

VII. Seedbed Crusting

In solid seeded soybeans the plants are spaced individually within the rows and cannot depend on mutual support for emerging through a crust. Do not hesitate to rotary hoe if soil becomes crusted prior to time of emergence. Rotary hoeing may reduce stands by 10%, however, a heavy crust could reduce stands by as much as 100%. Driving on the emerging beans generally will not reduce the stands significantly or cause long term effects in the wheel tracks.

VIII. Stand Counts

After emergence, soybean stands can be estimated by counting plants per 10' of row or plants per square yard. If counts are based on 10' of row, divide the total number of plants by 10 and use Table II to determine plants/acre. Use Table III to determine plants/acre if counts are based on plants per square yard. In either case, several random counts should be taken throughout the field to obtain an average number.

TABLE III — Plants/Per Sq. Yd. vs. Plants/Acre*

Plants/ sq. yd.	1,000s of plants/A	Plants/ sq. yd.	1,000s of plants/A	Plants/ sq. yd.	1,000s of plants/A
15	73	25	121	35	169
16	77	26	126	36	174
17	82	27	131	37	179
18	87	28	136	38	184
19	92	29	140	39	189
20	97	30	145	40	193
21	102	31*	150	41	198
22	106	32	155	42	203
23	111	33	160	43	208
24	116	34	165	44	213

*Example — If you count 31 plants per square yard your plant population is 150,000 per acre. Another method is to roll a 36" "Hula Hoop" in the field and let it fall. Count the number of plants inside and multiply by 6 for the approximate number (1,000's of plants)/acre. In either case, make at least 10 random counts per field.

IX. Weed Control

In conventional wide row soybeans, weed control throughout the season is accomplished by three primary factors — herbicides, cultivation and soybean competition (ground shading or canopy effect). Cultivation is not possible in solid seeded soybeans; therefore, the other two factors must provide season-long weed control. Research data and farmer experience have proven that these two factors will produce season long weed control if the following guidelines are followed:

1. Preplant incorporate a dinitroanaline herbicide, such as Basalin®, for control of annual grasses and small seeded broadleaf weeds such as lambsquarter and pigweed.
2. Till soil just prior to planting to further incorporate the dinitroanaline herbicide, to remove any germinated weeds, and to smooth and firm the seedbed.
3. Adjust seeding rates to provide good assurance of a full and uniform stand.
4. For control of broadleaf weeds such as cocklebur, velvetleaf, smartweed, jimsonweed and others (see Basagran® label) apply Basagran postemergence. The Basagran rate and time of application are determined by the weed size and species as per label.

Basagran should be applied early, before the soybean canopy begins to interfere with good spray coverage of the weeds and while the weeds are small and very susceptible to Basagran. Driving over the soybeans with ground sprayers will generally cause no adverse effects providing the soybeans are smaller than the third trifoliate leaf stage and the soil is not excessively wet. Basagran may be applied by air when fields are too wet for ground equipment. Follow label instructions closely.

X. Harvesting

Harvesting of solid seeded soybeans has created some problems in the past because of heavy weed infestations and/or beans wrapping at the end of the reel. Most equipment manufacturers now offer options which separate the beans out ahead of the reel and prevent wrapping. Most growers with the new or modified headers agree that harvesting solid seeded beans is easier and more efficient than harvesting conventional row beans.

With weed control achieved as outlined above, harvesting of solid seeded soybeans has several

advantages over conventional wide rows:

1. As a result of no cultivation ridges —
   a. Harvest in any direction to accommodate lodging, wet spots, etc.
   b. Headers don't dig in.
   c. Rocks are less likely to get into header.

2. Harvest losses reduced —
   a. Pods set higher.
   b. Lodging usually less severe.
   c. No ridges to interfere with header operation.

3. Combine efficiency increased —
   a. Even distribution of plants makes them easier to cut.
   b. Plants feed into combine more evenly.
   c. Full width of header is utilized.

XI. Soil Erosion

Most farmers solid seeding soybeans on sloping soil have discovered a significant reduction in soil erosion compared to that resulting from cultivated wide rows.

This reduction in soil erosion is the result of several factors. Solid seeded soybeans canopy quicker, affording earlier protection from erosive rain drops — and without cultivation to loosen and ridge the soil the ground stays level, firm and retains more trash on the surface, all of which help to hold the soil in place. Between season erosion can also be reduced by leaving the solid seeded ground undisturbed until spring — the combined effect of level ground, increased residue on the surface and closely spaced stubble to hold the residue in place gives considerable protection until the next crop is planted.

READ THE LABEL BEFORE USE. This technical information bulletin is not intended to provide complete information for use of Basagran or Basalin herbicides. Before using, read and carefully observe directions, cautionary statements and other information appearing on the product labels.

The information contained in this technical information bulletin reflects the opinion of experts based on field use and tests and is believed reliable. However, it is impossible to eliminate all risks inherently associated with the use of products of this type. Crop injury, ineffectiveness or unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF Wyandotte Corporation ("BWC") or the Seller. All such risks shall be assumed by the Buyer. BWC MAKES NO EXPRESS OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY. In no case shall BWC or the Seller be liable for consequential, special or indirect damage resulting from the use or handling of this product.

BASF

Basagran®

Post-emergence Herbicide

A soluble liquid formulation containing:

Active Ingredient:	
Sodium salt of bentazon*	**42.0%**
Inert Ingredients	**58.0%**

***Equivalent to 4 pounds per gallon bentazon (3-Isopropyl-1*H*-2,1,3-benzothiadiazin-4 (3*H*)-one 2,2-dioxide)**

EPA Reg. Number 7969-45

CAUTION

Keep out of reach of children.
Avoid contact with eyes or skin. In case of contact immediately flush eyes or skin with plenty of water. Get medical attention if irritation persists.

First Aid: If contacted, flush eyes immediately with water for at least 15 minutes. Call a physician.

Net Contents 1 Gallon

BASF Wyandotte Corporation
Parsippany, New Jersey 07054

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SPECIMEN LABEL

DIRECTIONS FOR USE—All Crops

Read the precautionary statement, environmental hazards, storage and disposal statements, and conditions of sale and warranty statement appearing on the container label.

General Information

Basagran selective herbicide is intended for the post-emergence control of certain broadleaf weeds and sedges. (See **Directions For Use** for specific crops and weeds.) Basagran does not control grasses. Basagran is effective mainly through contact action, therefore, weeds must be thoroughly covered with spray. Large crop-and-weed-leaf canopies shelter smaller weeds and prevent adequate spray coverage. Labeled crops are tolerant to Basagran, however, some leaf-speckling and leaf-bronzing may occur under certain conditions. (See **Restrictions and Limitations** for each crop.)

Timing of Applications

Apply Basagran early post-emergence when weeds are small and actively growing and before weeds reach the maximum size listed in the Basagran application rate tables for the individual crops.

Early application to weeds produces the most beneficial effect on weed control (exception, yellow nutsedge and Canada thistle), allows use of the lower rate (depending on weed species), and makes it easier to obtain thorough spray coverage. Delay in application which permits weeds to exceed the maximum size stated will result in inadequate control.

Do not cultivate within five days before or after Basagran application in the following northern and western states: AZ, CA, CO, CT, ID, IL, IN, IA, KS, KY, ME, MA, MI, MN, MO, MT, NB, NV, NH, NJ, NY, ND, OH, OR, PA, RI, SD, UT, VT, WA, WV, WI, WY.

Water Volume and Spray Pressure

Apply recommended rates of Basagran as follows:

Ground equipment: Use a minimum of 20 gals. of water per broadcast acre and a minimum of 40 psi pressure (measured at the boom—not at the pump or in the line). When crop and weed foliage is dense use up to 50 gals. of water and up to 80 psi pressure. Use standard high pressure pesticide hollow cone or flat fan nozzles spaced 20 inches apart. Do not use flood nozzles.

Air equipment: Use a minimum of 5 gals. of water per acre (except 10 gals. for rice) and a maximum of 40 psi pressure. Use only diaphragm-type nozzles producing cone or fan spray patterns.

Aerial Application—Special Directions

To obtain uniform coverage and to avoid drift hazards, the following application equipment and practices should be used:

Nozzle height: Maximum of 10 feet above crop.

Nozzle orientation: Nozzles must be oriented so as to discharge straight back with the air stream (opposite the direction of travel of the aircraft) or at some angle between straight back and straight down. For optimal coverage when applying Basagran by air in rice, orient all nozzles straight down.

Nozzles must not be located further out than three-fourths the distance from the center of the aircraft to the end of the wing or rotor.

Water volume and spray pressure: See above—**Air equipment.**

Do not apply Basagran by aircraft when wind is blowing at a velocity of 5 mph or greater. Coarse sprays (larger droplets) are less likely to drift.

Do not apply Basagran by air within 200 feet of ornamentals or sensitive non-target crops such as cotton, sugarbeets, sunflowers or okra.

Applicator must follow the most restrictive use cautions to avoid drift hazards, including those found in this labeling as well as applicable state and local regulations and ordinances.

Special Information

Irrigated areas: In irrigated areas, it may be necessary to irrigate prior to Basagran treatment to ensure weeds are growing actively. Weeds growing under drought conditions usually are not satisfactorily controlled.

Addition of Oil Concentrate to Spray Tank: Refer to recommendations for oil concentrate under the specific crop. Oil concentrate should be added to the spray tank under certain conditions. Use a non-phytotoxic oil concentrate (commonly referred to as oil concentrate) containing a blend of 80% (minimum) petroleum or vegetable base oil and 20% tolerance exempt surfactant. For ground application use oil concentrate at the maximum rate of 1 quart/acre. For air application use oil concentrate at the maximum rate of 1 pint/acre. In California, refer to additional information under the specific crop (corn, rice, beans). Fill tank of a throughly clean sprayer half to two-thirds full with clean water. Start agitation and add Basagran, allow to mix thoroughly. Add oil concentrate and remaining volume of water. Maintain constant agitation during application.

With Basagran on soybeans, beans and peanuts slight leaf burn occurs occasionally but all new growth is normal and crop vigor is not reduced. The potential for leaf burn is increased with addition of oil concentrate. This potential for leaf burn is greater under conditions of high temperature and relative humidity.

Do not add oil concentrate to Basagran for use on peas.

Restrictions and Limitations

Do not apply Basagran to crops listed on this labeling that have been subjected to stress conditions such as hail damage, flooding, drought, injury from other herbicides, or widely fluctuating temperatures, as crop injury may result.

Do not apply Basagran if crops listed on this label show injury (leaf phytotoxicity and/or plant stunting) produced by any other prior herbicide applications, because this injury may be enhanced and/or prolonged.

Do not apply Basagran during prolonged periods of drought or during unseasonably cold weather, as unsatisfactory weed control may result.

Rainfall or overhead irrigation soon after application (within 8 hours) may nullify the effectiveness of Basagran.

Do not mix or apply Basagran with any other pesticide or with fertilizer except as specifically recommended on this labeling.

Environmental Hazards

Avoid contamination of lakes, streams, or ponds. Do not apply where runoff is likely to occur.

Do not apply when weather conditions favor drift from target area.

Storage and Disposal

Do not allow product to freeze.

Do not contaminate water, food or feed by storage or disposal. Open dumping prohibited. Do not reuse empty container.

Pesticide, spray mixture or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

Triple rinse container and dispose of in an incinerator or landfill approved for pesticide containers, or bury in a safe place.

Consult federal, state or local disposal authorities for approved alternative procedures such as limited open burning.

FOR DIRECTIONS FOR USE—SPECIFIC CROPS —SEE FOLLOWING PAGES.

SOYBEANS—Directions for Use

Basagran applications should be made when weeds are small and actively growing and before weeds reach the maximum size listed in the Basagran Application Rate Table for Soybeans. Such applications generally correspond to the soybean growth stages of unifoliate to two expanded trifoliate leaves. Soybeans are tolerant to Basagran at all stages of growth. Slight leaf-yellowing, -bronzing, -speckling,or -burning may occur under certain conditions. Soybean plants generally outgrow this condition within 10 days.

Restrictions and Limitations

Do not apply more than a total of 2 quarts of Basagran per acre in one season.

Application Rate Table for Soybeans

Weeds Controlled	Application Rates for Weed Growth Stages			
	¾ Qt. Per Acre		1 Qt. Per Acre	
	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Balloonvine (*Cardiospermum halicacabum*)	2-4	2"	4-6	3"
Beggarticks (*Bidens frondosa*)	up to 6	6"	6-8	8"
Bristly Starbur (*Acanthospermum hispidum*)	up to 4	2"	4-6	3"
Cocklebur (*Xanthium pensylvanicum*)	2-6*	6"	6-10	10"
Coffee Senna (*Cassia occidentalis*)	Not Recommended		up to 1 pinnate **	2"
Common Lambsquarters (*Chenopodium album*)	Not Recommended		4-8 **	2"
Common Purslane *Portulaca oleracea*	up to 4	1"	4-6	2"
Common Ragweed (*Ambrosia artemisiifolia*)	Not Recommended		4-6 **	3"
Dayflower (*Commelina spp.*)	up to 6	4"	6-10	8"
Devilsclaw (*Probiscidea louisianica*)	Not Recommended		up to 6 **	3"
Galinsoga (*Galinsoga spp.*)	Not Recommended		cotyledon to 6 **	2"
Giant Ragweed †† (*Ambrosia trifida*)	Not Recommended		up to 4	6"
Jimsonweed (*Datura stramonium*)	up to 6	6"	6-10	10"
Ladysthumb (*Polygonum persicaria*)	up to 6	6"	6-10	10"
Pennsylvania Smartweed (*Polygonum pensylvanicum*)	up to 6	6"	6-10	10"
Prickly Sida or Teaweed (*Sida spinosa*)	up to 6	3"	5-8	4"
Redweed (*Melochia corchorifolia*)	4-6	6"	6-10	8"
Sesbania (*Sesbania exaltata*)	Not Recommended		3-5 **	3"
Shepherdspurse (*Capsella bursa-pastoris*) †††	up to 6	4"	6-10	8"
Spurred Anoda (*Anoda cristata*)	up to 6	3"	6-8	4"
Tropic Croton (*Croton glandulosus*)	up to 2	2"	2-4	4"
Velvetleaf (*Abutilon theophrasti*)	up to 4 **	2"	4-6 **	5"
Venice Mallow (*Hibiscus trionum*)	up to 6	2"	6-10	4"
Wild Buckwheat (*Polygonum convolvulus*)	up to 4	3"	4-6	5"
Wild Mustard (*Brassica kaber*)	up to 6	4"	6-10"	8"
Wild Poinsettia (*Euphorbia heterophylla*)	2-4 **	4"	4-8 **	6"
Wild Sunflower (*Helianthus annuus*)	up to 4	5"	4-6	8"
For additional weeds see Special Directions section following.				

*Do not treat earlier than leaf stage shown and do not count cotyledon leaves
**Add oil concentrate according to the DIRECTIONS FOR USE—All Crops
†Recommended in the North only. Control may be partial or inconsistent
††If after the first application a second weed flush develops, re-treat according to this rate table
†††Do not treat rosette before seed stalk appears

Special Directions for Other Weed Problems in Soybeans

Annual Morningglories (*Ipomoea* spp. and *Jacquemontia tamnifolia*)

South: (AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, TX, VA). To control smallflower (*J. tamnifolia*) and cypressvine (*I. quamoclit*) morningglories apply a single application of either ¾ quart of Basagran per acre to plants not larger than 4 true leaves and 4 inches in height, OR 1 quart of Basagran per acre to plants not larger than 6 true leaves and 6 inches in height.

To control palmleaf (*I. wrightii*), pitted (*I. lacunosa*), common (*I. purpurea*), entireleaf (*I. hederacea* var. *intergruscula*), and ivyleaf morningglories (*I. hedaracea*) and purple moonflower (*I. muricata*), apply ¾ quart of Basagran per acre to plants not larger than 4 true leaves and 4 inches in height (14 to 18 days after morningglory emergence). Make a second application at the same rate 5 to 14 days later.

All states other than the south (see above): Apply 1 to 1½ quarts of Basagran per acre to annual morningglories not larger than 4 true leaves. Control may be partial or inconsistent. Add oil concentrate to the Basagran/water spray solution according to the DIRECTIONS FOR USE—All Crops.

Because morningglories grow very rapidly, it is important to watch the growth stage carefully and to be certain that Basagran is applied to morningglories before they exceed the maximum size recommended on the label.

Canada Thistle (*Cirsium arvense*)
Apply 1 quart of Basagran per acre when plants are from 8 inches tall to the bud stage. Make a second application at the same rate 7 to 10 days later.

Yellow Nutsedge (*Cyperus esculentus*)
South: (AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, TX, VA). Two applications are preferred for best results. Apply ¾ to 1 quart of Basagran per acre when plants are 6 to 8 inches tall. If needed, make a second application at the same rate 7 to 10 days later.

All states other than the south (see above): Two applications are preferred for best results. Apply ¾ to 1 quart of Basagran per acre when plants are 6 to 8 inces tall. If needed, make a second application at the same rate 7 to 10 days later. Add oil concentrate to the Basagran/water spray solution for each application according to the DIRECTIONS FOR USE—All Crops.

Field and Hedge Bindweed (*Convolvulus arvensis* and *sepium*) in KY, IL, IN, MI, OH *only*.
For suppression of field and hedge bindweed, apply 1 to 1½ quarts of Basagran per acre when vines are a maximum of 10 inches long. Add oil concentrate to the Basagran/water spray solution according to the DIRECTIONS FOR USE—All Crops.

Late Cocklebur Rescue Treatment
This treatment is intended to provide only partial control of cocklebur in the event early post-emergence treatments were not made. Very thorough spray coverage is essential. Apply a single application of 1 to 1½ quarts of Basagran per acre to plants up to 24 inches tall or, for best results, apply ¾ quart of Basagran per acre to plants up to 24 inches tall and repeat 10 to 14 days later.

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PEANUTS—Directions For Use

Basagran applications should be made when weeds are small and actively growing and before weeds reach the maximum size listed in the **Application Rate Table for Peanuts.** Such applications generally correspond to the peanut growth stages of bunching to pegging.

Peanuts are tolerant to Basagran at all stages of growth, but slight leaf-speckling may occur under certain conditions (see **Restrictions and Limitations**). Peanut plants generally outgrow this condition within 10 days.

Restrictions and Limitations

Do not apply Basagran if peanuts show injury (leaf phytotoxicity and/or plant stunting) produced by any prior herbicide applications (preplant-incorporated, preemergence, cracking and/or post-emergence), because this injury may be enhanced and/or prolonged. In the Southeast, in-furrow treatments of insecticides/nematicides may possibly predispose the peanuts to Basagran injury.

Do not apply more than a total of 2 quarts of Basagran per acre in one season.

Peanut hay and forage may be fed to livestock.

Application Rate Table for Peanuts

Weeds Controlled	Application Rates for Weed Growth Stages			
	¾ Qt. Per Acre		1 Qt. Per Acre	
	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Balloonvine *(Cardiospermum halicacabum)*	2-4	2"	4-6	3"
Beggarticks *(Bidens frondosa)*	up to 6	6"	6-8	8"
Bristly Starbur *(Acanthospermum hispidum)*	up to 4	2"	4-6	3"
Cocklebur *(Xanthium pensylvanicum)*	2-6*	6"	6-10	10"
Coffee Senna *(Cassia occidentalis)*	Not Recommended		up to 1 pinnate **	2"
Common Ragweed *(Ambrosia artemisiifolia)*	Not Recommended		4-6 **	3"
Dayflower *(Commelina spp.)*	up to 6	4"	6-10	8"
Devilsclaw *(Proboscidea louisianica)*	Not Recommended		up to 6 **	3"
Giant Ragweed *(Ambrosia trifida)*	Not Recommended		up to 4	6"
Jimsonweed *(Datura stramonium)*	up to 6	6"	6-10	10"
Ladysthumb *(Polygonum persicaria)*	up to 6	6"	6-10	10"
Penna. Smartweed *(Polygonum pensylvanicum)*	up to 6	6"	6-10	10"
Prickly Sida or Teaweed *(Sida spinosa)*	up to 6	3"	6-8	4"
Spurred Anoda *(Anoda cristata)*	up to 6	3"	6-8	4"
Tropic Croton *(Croton glandulosus)*	up to 2	2"	2-4	4"
Velvetleaf *(Abutilon theophrasti)*	up to 4	2"	4-6	5"
Wild Sunflower *(Helianthus annuus)*	up to 4	5"	4-6	8"
For additional weeds see Special Directions section following.				

*Do not treat earlier than leaf stage shown and do not count cotyledon leaves.
**Add oil concentrate according to the DIRECTIONS FOR USE—All Crops.

Special Directions for Other Weed Problems in Peanuts

Annual Morningglories *(Ipomoea* spp. and *Jacquemontia tamnifolia)*
To control smallflower *(J. tamnifolia)* and cypressvine *(I. quamoclit)* morningglories apply a single application of either ¾ quart of Basagran per acre to plants not larger than 4 true leaves and 4 inches in height, OR 1 quart of Basagran per acre to plants not larger than 6 true leaves and 6 inches in height.

To control palmleaf *(I. wrightii)*, pitted *(I. lacunosa)*, common *(I. purpurea)*, entireleaf *(I. hederacea* var. *intergruscula)*, and ivyleaf morningglories *(I. hederacea)* and purple moonflower *(I. muricata)*, apply ¾ quart of Basagran per acre to plants not larger than 4 true leaves and 4 inches in height (14 to 18 days after morningglory emergence). Make a second application at the same rate 5 to 14 days later.

Because morningglories grow very rapidly it is important to watch the growth stage carefully and to be certain that Basagran is applied to morningglories before they exceed the maximum size recommended on the label.

Yellow Nutsedge *(Cyperus esculentus)*
Two applications are preferred for best results. Apply ¾ to 1 qt. of Basagran per acre when plants are 6 to 8 inches tall. In Texas and Oklahoma use 1 qt. If needed, make a second application at the same rate 7 to 10 days later. Add oil concentrate to the Basagran/water spray solution according to the DIRECTIONS FOR USE—All Crops.

Late Cocklebur Rescue Treatment
This treatment is intended to provide only partial control of cocklebur in the event early post-emergence treatments were not made. Very thorough spray coverage is essential. Apply a single application of 1 to 1½ quarts of Basagran per acre to plants up to 24 inches tall or, for best results, apply ¾ quart of Basagran per acre to plants up to 24 inches tall and repeat 10 to 14 days later.

CORN—Directions For Use

Basagran applications should be made when weeds are small and actively growing and before weeds reach the maximum size listed in the **Application Rate Table for Corn**. Such applications generally correspond to the corn growth stages of one to five leaves. Corn is tolerant to Basagran at all stages of growth, but very slight leaf-speckling may occur. Corn plants generally outgrow this condition within 10 days.

Restrictions and Limitations

Do not apply more than a total of 2 quarts per acre in one season. Not recommended for control of yellow nutsedge in corn in California.

Seed corn producers should consult the seed corn company regarding tolerance of seed production inbred lines to Basagran.

Application Rate Table for Corn

	Application Rates for Weed Growth Stages			
	¾ Qt. Per Acre		1 Qt. Per Acre	
Weeds Controlled	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Beggarticks *(Bidens frondosa)*	up to 6	6"	6-8	8"
Bristly Starbur *(Acanthospermum hispidum)*	up to 4	2"	4-6	3"
Cocklebur *(Xanthium pensylvanicum)*	2-6*	6"	6-10	10"
Common Lambsquarters† *(Chenopodium album)*	Not Recommended		4-8	2"
Common Ragweed *(Ambrosia artemisiifolia*	Not Recommended		4-6	3"
Dayflower *(Commelina spp.)*	up to 6	4"	6-10	8"
Galinsoga *(Galinsoga sp.)*	Not Recommended		cotyledon to 6	2"
Giant Ragweed†† *(Ambrosia trifida)*	Not Recommended		up to 4	6"
Jimsonweed *(Datura stramonium)*	up to 6	6"	6-10	10"
Ladysthumb *(Polygonum persicaria)*	up to 6	6"	6-10	10"
Penna. Smartweed *(Polygonum pensylvanicum)*	up to 6	6"	6-10	10"
Prickly Sida or Teaweed *(Sida spinosa)*	up to 6	3"	6-8	4"
Spurred Anoda *(Anoda cristata)*	up to 6	3"	6-8	4"
Tropic Croton *(Croton glandulosus)*	up to 2	2"	2-4	4"
Velvetleaf *(Abutilon theophrasti)*	up to 4	2"	4-6	5"
Venice Mallow *(Hibiscus trionum)*	up to 6	2"	6-10	4"
Wild Buckwheat *(Polygonum convolvulus)*	up to 4	3"	4-6	5"
Wild Mustard *(Brassica kaber)*	up to 6	4"	6-10	8"
Wild Sunflower *(Helianthus annuus)*	up to 4	5"	4-6	8"

For additional weeds see Special Directions section following.

*Do not treat earlier than leaf stage shown and do not count cotyledon leaves.

**Add oil concentrate according to the DIRECTIONS FOR USE-All Crops. In California, add non-phytotoxic oil (containing emulsifier) to the Basagran water spray solution for each application by ground equipment at the rate of ½ gallon per acre in coastal valleys and 1 gallon per acre in central valleys. Add non-phytotoxic oil to the spray solution for each application by air equipment at the rate of 1% by volume (1 gallon per 100 gallons spray solution). The oil should have an unsulphonated residue rating of 90% or above.

†Control may be partial or inconsistent.

††If after the first application a second weed flush develops, re-treat according to this rate table.

Special Directions For Other Weed Problems in Corn

Annual Morningglories *(Ipomoea* spp. and *Jacquemontia tamnifolia)*
South: (AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, TX, VA). To control smallflower *(J. tamnifolia)* and cypressvine *(I. quamoclit)* morningglories apply a single application of either ¾ quart of Basagran per acre to plants not larger than 4 true leaves and 4 inches in height, OR 1 quart of Basagran per acre to plants not larger than 6 true leaves and 6 inches in height.

To control palmleaf *(I. wrightii)*, pitted *(I. lacunosa)*, common *(I. purpurea)*, entireleaf *(I. hederacea* var. *intergruscula)*, and purple moonflower *I. muricata)*, apply ¾ quart of Basagran per acre to plants not larger than 4 true leaves and 4 inches in height (14 to 18 days after morningglory emergence). Make a second application at the same rate 5 to 14 days later.

All states other than the South (see above): Apply 1 to 1½ quarts of Basagran per acre to annual morningglories not larger than 4 true leaves. Control may be partial or inconsistent. Add oil concentrate to the Basagran water/spray solution according to the DIRECTIONS FOR USE—All Crops.

Because morningglories grow very rapidly, it is important to watch the growth stage carefully and to be certain that Basagran is applied to morningglories before they exceed the maximum size recommended on the label.

Canada Thistle *(Cirsium arvense)*
Apply 1 quart of Basagran per acre when plants are from 8 inches tall to the bud stage. Make a second application at the same rate 7 to 10 days later.

Yellow Nutsedge *(Cyperus esculentus)*
South: (AL, AR, FL, GA, LA, MS, NC, OK, SC, TN, TX, VA). Two applications are preferred for best results. Apply ¾ to 1 quart of Basagran per acre when plants are 6 to 8 inches tall. If needed, make a second application at the same rate 7 to 10 days later.

All states other than the south (see above): Two applications are preferred for best results. Apply ¾ to 1 quart of Basagran per acre when plants are 6 to 8 inches tall. If needed, make a second application at the same rate 7 to 10 days later. Add oil concentrate to the Basagran/water spray solution for each application according to the DIRECTIONS FOR USE—All Crops.

Field and Hedge Bindweed *(Convolvulus arvensis* and *sepium)* in KY, IL, IN, MI, OH *only*.
For suppression of field and hedge bindweed, apply 1 to 1½ quarts of Basagran per acre when vines are a maximum of 10 inches long. Add oil concentrate to the Basagran/water spray solution according to the DIRECTIONS FOR USE—All Crops.

Late Cocklebur Rescue Treatment
This treatment is intended to provide only partial control of cocklebur in the event early post-emergence treatments were not made. Very thorough spray coverage is essential. Apply a single application of 1 to 1½ quarts of Basagran per acre to plants up to 24 inches tall or, for best results, apply ¾ quart of Basagran per acre to plants up to 24 inches tall and repeat 10 to 14 days later.

TANK MIXTURE
with Atrazine and Oil Concentrate for Post-emergence Applications for Corn

The Basagran/atrazine/oil concentrate tank mix effectively controls a broad spectrum of broadleaf weeds included on labeling of both products. For the control of annual morninglories, Canada thistle and yellow nutsedge, refer to the section titled **Special Directions for Other Weed Problems in Corn.**

Atrazine products compatible with Basagran include AAtrex 80W, AAtrex 4L, AAtrex 4LC, and AAtrex Nine-0 (AAtrex is a registered trademark of CIBA-GEIGY). Refer to the respective atrazine labels for additional directions and limitations. *Always add oil concentrate* according to the **DIRECTIONS FOR USE—All Crops.**

Mixing and spray equipment: Use intake, in-line, or nozzle screens no finer than 50 mesh. Fill tank of a thoroughly clean sprayer half to two-thirds full of clean water. Start agitation. Add atrazine and allow to wet and mix thoroughly. Maintain agitation and add Basagran, allow to mix. Add oil concentrate and remaining quantity of water and mix thoroughly. Maintain constant agitation during application. Avoid allowing the mixture to stand overnight. Always clean sprayer thoroughly immediately after use by flushing the system with water and a strong detergent. Do not allow cleaning water to contaminate any streams or ponds.

Time and rate application: Tank mix applications should be made when weeds are small and actively growing and before weeds reach the maximum size listed in the **Application Rate Table for Basagran/Atrazine Tank Mix for Corn.** Such applications generally correspond to the corn growth stages of one to five leaves. Corn is tolerant to the tank mix at all stages of growth, but very slight leaf-speckling may occur. Corn plants generally outgrow this condition within 10 days. Refer to the Conversion Table below for application rates depending on formulation. A cultivation may be necessary if all weeds are not controlled or if regrowth of weeds occurs.

Restrictions and Limitations for Tank Mixture

Do not use tank mix when crop is under stress from prolonged cold, wet weather, poor fertility, or other factors or when crop is wet and succulent from recent rainfall as crop injury may occur.

Seed corn producers should consult the seed corn company regarding tolerance of seed production inbred lines to tank mix.

Do not make more than one application of tank mix per season.

Do not graze treated area or feed treated forage to livestock for 21 days following application (see AAtrex label).

Application Rate Table for Basagran/Atrazine Tank Mix for Corn

Weeds Controlled	Application Rates For Weed Growth Stages			
	½ + ½ lb ai/A*		¾ + ¾ lb ai/A*	
	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Cocklebur *(Xanthium pensylvanicum)*	2-6**	4"	6-10	8"
Common Lambsquarters †*(Chenopodium album)*	4-8	2"	8-12	4"
Common Ragweed *(Ambrosia artemisiifolia)*	up to 4	2"	4-6	3"
Giant Ragweed *(Ambrosia trifida)*	up to 4	4"	4-6	6"
Jimsonweed *(Datura stramonium)*	up to 6	4"	6-10	8"
Ladysthumb *(Polygonum persicaria)*	up to 6	4"	6-10	8"
Penna. Smartweed *(Polygonum pensylvanicum)*	up to 6	4"	6-10	8"
Redroot Pigweed *(Amaranthus retroflexus)*	4-8	2"	8-12	4"
Velvetleaf *(Abutilon theophrasti)*	up to 4	2"	4-6	5"
Venice Mallow *(Hibiscus trionum)*	up to 6	2"	6-10	4"
Wild Buckwheat *(Polygonum convolvulus)*	up to 4	3"	4-6	5"
Wild Mustard *(Brassica kaber)*	up to 6	4"	6-10	8"
Wild Sunflower *(Helianthus annuus)*	up to 4	4"	4-6	8"

OTHER WEEDS: Other weeds listed individually on the Basagran or atrazine corn labels at the ¾ pound rate will also be controlled with the ¾ pound plus ¾ pound Basagran/atrazine tank mix. Refer to the respective labels.

*Refer to Conversion Table for recommended rate of formulated product per acre. Always add oil concentrate according to the DIRECTIONS FOR USE—All Crops. In California, add non-phytotoxic oil (containing emulsifier) to the Basagran/water spray solution for each application by ground equipment at the rate of ½ gallon per acre in coastal valleys and 1 gallon per acre in central valleys. Add non-phytotoxic oil to the spray solution for each application by air equipment at the rate of 1% by volume (1 gal. per 100 gals. spray solution). The oil should have an unsulphonated residue rating of 90% or above.

**Do not treat earlier than leaf stage shown and do not count cotyledon leaves.

†Control may be partial or inconsistent.

Acreage Conversion Table

Tank Mix Rate Recommendation (lb ai/A)*	Rate of Formulated Product									
	Basagran	Atrazine (AAtrex)								
		1 Acre			10 Acres			50 Acres		
	Qts.	80W lb/A	Nine-0 lb/A	4L or 4LC pts.	80W lb/A	Nine-0 lb/A	4L or 4LC pts	80W lb/A	Nine-0 lb/A	4L or 4LC pts
½ + ½	½	⅝	6/10	1	6¼	6	10	31½	30	50
¾ + ¾	¾	1	9/10	1½	10	9	15	50	45	75

*According to weed growth stage indicated in above table.

RICE—Directions For Use

Apply Basagran early post-emergence before weeds exceed the maximum size listed in the **Application Rate Table for Rice.**

Early application produces the most beneficial effect on crop yields, allows use of the lower rate (depending on weed species), and makes it easier to obtain thorough spray coverage. Delay in application which permits weeds to exceed the maximum size for a given rate will result in inadequate control.

Basagran has no adverse effect on rice when used according to directions and may be used on the first and second (ratoon) crop. If grasses are a problem, use propanil in tank mixture with Basagran (see below).

For optimal coverage when applying Basagran by air in rice, orient all nozzles straight down. For additional aerial application information, refer to **DIRECTIONS FOR USE—All Crops.**

Alternate flooding culture: In Texas, Louisiana, Arkansas and Mississippi, weed growth stages generally correspond to rice that is tillering (stooling) and occur prior to the permanent flood. Application of Basagran *must* be made when there is no water on the field and 24 hours or more prior to flooding. If Basagran cannot be applied until after flooding, see directions under **Continuous Flooding Culture.**

Continuous flooding culture: In California and in other states using continuous flooding culture or when treating after permanent flood, treatment should be made only when weeds are above the surface of the water. Weeds submerged at the time of application are not adequately controlled.

For early treatment, water may be partly or completely drained to expose more weed growth to Basagran spray applications. Do not raise water level for at least 24 hours after application or unsatisfactory control may result. Do not use ground equipment for applications on flooded fields because splashing will wash Basagran off weed leaf surfaces and ineffective control will result.

Addition of non-phytotoxic oil to spray tank in California only: In California, add non-phytotoxic oil (containing emulsifier) to the Basagran/water spray solution for each application by ground or air at a range of 1 to 5% by volume (1-5 gallons/100 gallons spray solution). On days when the maximum temperature is predicted below 90°F, use the upper range of oil (i.e. 4-5%). On days when the maximum temperature is predicted to exceed 90°F, use the lower range of oil (i.e. 1-2%). The oil should have an unsulphonated residue rating of 90% or above.

Restrictions and Limitations

Rice straw may be fed to livestock.

Do not apply Basagran to rice with ground equipment when field is flooded because splashing will wash Basagran off weed leaf surfaces and ineffective control will result.

Do not apply more than 3 quarts of Basagran per acre in one season. (Maximum of 2 quarts per acre in first crop and 1 quart per acre in second ratoon crop.)

Tank Mixture with Propanil.

Use a tank mixture of Basagran/propanil by ground or air for the control of mixed populations of grasses and broadleaf weeds listed as susceptible on the two product labels. Prepare tank mixture by adding Basagran to half the final volume of water with agitation running. Then add propanil and bring mixture to final volume. Agitation must be continuous from time of mixing through spraying.

Apply at the rate per acre of ¾ quarts of Basagran plus either 3 quarts (4 lb./gal.) or 1 gallon (3 lb./gal.) of propanil formulation (see below*) in the spray volume specified on this labeling.

Apply this tank mixture only to drained fields.

Do not use propanil on second crop (ratoon) rice.

When applying Basagran/propanil tank mix by air, orient all nozzles straight back in accordance with the propanil label.

Do not add non-phytotoxic oil to the Basagran/propanil tank mix.

Observe all cautions and limitations on the labels of both products.

*Propanil products compatible with Basagran are STAM F-34 (3 lb./gal.), STAM M-4 (4 lb./gal.), Helena 4 (4 lb./gal.) and Crystal 4E (4 lb./gal.).

Application Rate Table for Rice

Weeds Controlled (All States)	Application Rates for Weed Growth Stages							
	For Drained Fields				For Flooded Fields			
	¾ Qt. Per Acre*		1 Qt. Per Acre*		¾ Qt. Per Acre*		1 Qt. Per Acre*	
	Leaf Stage	Maximum Height	Leaf Stage	Maximum Height	Maximum Height Above Soil	Minimum Height Range Above Water Level	Maximum Height Above Soil	Minimum Height Range Above Water Level
Cocklebur *(Xanthium pensylvanicum)*	2-10	10"	10-15	15"	10"	3"-6"	15"	6"-10"
Dayflower *(Commelina spp.)*	2-10	6"	10-15	10"	6"	3"-5"	10"	5"-8"
Ducksalad *(Heteranthera limosa)*	Not Recommended		6-10**	6"	Not Recommended		Not Recommended	
Gooseweed *(Sphenoclea zeylanica)*	4-6	4"	6-10	8"	Not Recommended		Not Recommended	
Redweed *(Melochia corchorifolia)*	4-6	6"	6-10	8"	Not Recommended		Not Recommended	
Redstem *(Ammannia spp.)*	up to 6	4"	6-10	8"	4"	2"-3"	8"	4"-6"
Smartweed *(Polygonum spp.)*	2-10	6"	10-15	10"	6"	3"-5"	10"	5"-8"
Spikerush *(Eleocharis macrostachya)*	2-6	6"	6-8	8"	Not Recommended		Not Recommended	
WATER PLANTAINS **Arrowhead** *(Sagittaria spp.)* **Common Water Plantain** *(Alisma triviale)*	Not Recommended		up to 4	7"	Not Recommended		7"	5"-6"
Yellow Nutsedge *(Cyperus esculentus)*	4-6	6"	6-8	10"	6"	4"-5"	10"	6"-8"
Weeds Controlled (California Only)								
River Bulrush *(Scirpus fluviatilis)*	Not Recommended		6-8†	10"-30"	Not Recommended		10"-30"†	10"-24"
Roughseed Bulrush *(Scirpus mucronatus)*	Not Recommended		2-4††	10"	Not Recommended		10"††	6"-8"
Roundleaf Waterhyssop *(Bacopa rotundifolia)*	Not Recommended		8-10	10"	Not Recommended		10"	6"10"
Smallflower Umbrellaplant *(Cyperus difformis)*	Not Recommended		4-6††	10"	Not Recommended		10"††	6"-8"

*If after the first application a second weed flush develops, re-treat according to this Rate Table.

**Control may be partial or inconsistent.

†Land preparation should be such that rhizomes are thoroughly cut up so there are no more than 2 tubers per rhizome section remaining. Apply Basagran when 10-15% of the river bulrush plants are flowering.

††Apply Basagran before weeds are flowering.

BEANS (Dry or Succulent)—Directions For Use

Apply Basagran early post-emergence when weeds are small and actively growing and before weeds reach the maximum size listed in the **Application Rate Table for Beans.** Such weed growth stages generally correspond to bean stages of greater than one expanded trifoliate leaf.

Beans are tolerant to Basagran after the first trifoliate leaf has fully expanded. Snap bean injury can be very pronounced. Even at the tolerant stages yellowing, bronzing, speckling or burning of leaves may occur under certain conditions (see **Restrictions and Limitations**). This temporary injury is generally outgrown without delaying podset or maturity or reducing yield. The use of oil with Basagran may increase injury and may reduce yields.

Tolerant bean types are navy, pinto, pinks, great northern, kidney, red, whites, cranberry, black turtle soup, small limas, large limas, and snap beans.

Western Irrigated Areas

In the western irrigated areas, it may be necessary to irrigate prior to Basagran treatment to ensure weeds are growing actively. Weeds that are growing under moisture stress are not actively growing and are not satisfactorily controlled.

Avoid application of Basagran during prolonged periods of cold weather (day temperature below 75°F and night temperature below 55°F for 2-5 days) because weed control may be nullified.

Restrictions and Limitations

Do not apply Basagran to bean fields until beans have *at least the first trifoliate leaf fully expanded because severe crop damage may occur.*

Do not apply Basagran to blackeyes grown in California or to garbanzo beans at any stage of growth, as severe crop damage will occur.

Do not apply more than a total of 2 quarts of Basagran per acre in one season.

In succulent beans only, do not apply Basagran within 30 days of harvest.

Application Rate Table for Beans (Dry or Succulent)

Weeds Controlled	Application Rates for Weed Growth Stages			
	¾ Qt. Per Acre		1 Qt. Per Acre	
	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Cocklebur *(Xanthium pensylvanicum)* (PNW)	2-6*	6"	6-10	10"
Common Lambsquarters *(Chenopodium album)*†	Not Recommended		4-8**	2"
Common Purslane *(Portulaca oleracea)*	up to 4	1"	4-6**	2"
Common Ragweed *(Ambrosia artemisiifolia)*	Not Recommended		4-6**	3"
Devilsclaw *(Proboscidea louisianica)*	Not Recommended		up to 6**	3"
Galinsoga *(Galinsoga spp.)*	Not Recommended		cotyledon to 6**	2"
Giant Ragweed *(Ambrosia trifida)*††	Not Recommended		2-4	6"
Hairy Nightshade *(Solanum sarachioides)****	Not Recommended		2-6	4"
Jimsonweed *(Datura stramonium)*	up to 6	6"	6-10	10"
Ladysthumb *(Polygonum persicaria)*	up to 6	6"	6-10	10"
Penna. Smartweed *(Polygonum pensylvanicum)*	up to 6	4"	6-10	10"
Prickly Sida or Teaweed *(Sida spinosa)*	up to 6	3"	6-8	4"
Shepherdspurse *(Capsella bursa-pastoris)*†††	up to 6	4"	6-10	8"
Velvetleaf *(Abutilon theophrasti)*	up to 4**	2"	4-6	5"
Wild Mustard *(Brassica kaber)* (PNW)	up to 6	4"	6-10	10"
Wild Sunflower *(Helianthus annuus)*	up to 4	5"	4-6	8"

For additional weeds see Special Directions section following.

*Do not treat earlier than leaf stage shown and do not count cotyledon leaves.

**Add oil concentrate according to the DIRECTIONS FOR USE—All Crops. In California, add non-phytotoxic oil (containing emulsifier) to the Basagran/water spray solution for each application by ground equipment at the rate of ½ gallon per acre in coastal valleys and 1 gallon per acre in central valleys. Add non-phytotoxic oil to the spray solution for each application by air equipment at the rate of 1% by volume (1 gal. per 100 gal spray solution). The oil should have an unsulphonated residue rating of 90% or above. The use of oil with Basagran may increase injury and may reduce yields.

***Basagran does not adequately control black nightshade (Solanum nigrum).

†Control may be partial or inconsistent.

††If after the first application a second weed flush develops, re-treat according to this rate table.

†††Do not treat rosette before seed stalk appears.

PNW See special directions for Pacific Northwest.

Special Directions for Other Weed Problems in Beans.

Yellow Nutsedge *(Cyperus esculentus)*

Two applications are preferred for best results. Apply ¾ to 1 quart (except PNW) of Basagran per acre when plants are 6 to 8 inches tall. If needed, make a second application at the same rate 7 to 10 days later.

Add oil concentrate to the Basagran/water spray solution for each application according to the DIRECTIONS FOR USE—All Crops.

In California, apply 1 qt. of Basagran per acre when plants are 6 to 8 inches tall. Make a second application at the same rate 10 to 14 days later. Add non-phytotoxic oil (containing emulsifier) to the Basagran/water spray solution for each application by ground equipment at the rate of ½ gal. per acre in coastal valleys and 1 gal. per acre in central valleys. Add non-phytotoxic oil to the spray solution for each application by air equipment at the rate of 1% by volume (1 gal. per 100 gals. spray solution. The oil should have an unsulphonated residue rating of 90% or above. The use of oil with Basagran may increase injury and may reduce yields.

Canada Thistle *(Cirsium arvense)*

Apply 1 quart of Basagran per acre when plants are from 8 inches tall to the bud stage. Make a second application at the same rate 7 to 10 days later.

Field and Hedge Bindweed *(Convolvulus arvensis* and *sepium)* in KY, IL, IN, MI, OH *only.*

For suppression of field and hedge bindweed, apply 1 to 1½ quarts of Basagran per acre when vines are a maximum of 10 inches long. Add oil concentrate to the Basagran/water spray solution according to the DIRECTIONS FOR USE—All Crops.

Pacific Northwest (ID, OR, WA.)

For control of cocklebur, yellow nutsedge, and wild mustard, use only the 1 quart rate.

For cocklebur, treat when plants are in the 2-10 leaf stage and a maximum height of 10 inches.

For yellow nutsedge, follow the directions indicated above using only the 1 quart rate.

For wild mustard, treat when plants are up to the 10 leaf stage and a maximum height of 10 inches.

PEAS (Dry or Succulent)—Directions For Use

Apply Basagran early post-emergence when weeds are small and actively growing and before weeds reach the maximum size listed in the **Application Rate Table for Peas.** Such weed growth stages generally correspond to pea stages of greater than 3 pairs of leaves (or 4 nodes).

Peas are tolerant to Basagran after 3 pairs of leaves (or 4 nodes) are present. Pea injury can be very pronounced. Even at the tolerant stages yellowing, bronzing, speckling or burning of leaves may occur under certain conditions (see **Restrictions and Limitations).** This temporary injury is generally outgrown without delaying podset or maturity or reducing yield.

Tolerant pea types are garden peas and southern peas.

Western Irrigated Areas

In the western irrigated areas, it may be necessary to irrigate prior to Basagran treatment to ensure weeds are growing actively. Weeds that are growing under moisture stress are not actively growing and are not satisfactorily controlled.

Avoid application of Basagran during prolonged periods of cold weather (day temperature below 75°F and night temperature below 55°F for 2-5 days) because weed control may be nullified.

Restrictions and Limitations

Do not apply Basagran to pea fields until *peas have at least 3 pairs of leaves (or 4 nodes) because severe crop damage may occur.*

In the Southwest, in-furrow treatments of insecticides/nematicides may possibly predispose the peas to Basagran injury.

Do not apply Basagran to blackeyes grown in California or to garbanzo beans at any stage of growth, as severe crop damage will occur

Do not apply more than a total of 2 quarts of Basagran per acre in one season.

Do not add oil to Basagran for use on peas.

Application Rate Table for Peas (Dry or Succulent)

Weeds Controlled	Application Rates for Weed Growth Stages			
	¾ Qt. Per Acre		1 Qt. Per Acre	
	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Cocklebur *(Xanthium pensylvanicum)* (PNW)	2-4*	6"	6-10	10"
Common Purslane *(Portulaca oleracea)*	up to 4	1"	4-6	2"
Giant Ragweed *(Ambrosia trifida)* †	Not Recommended		2-4	6"
Hairy Nightshade *(Solanum sarachoides)* **	Not Recommended		2-6	4"
Jimsonweed *(Datura stramonium)*	up to 6	6"	6-10	10"
Ladysthumb *(Polygonum persicaria)*	up to 6	6"	6-10	10"
Penna. Smartweed *(Polygonum pensylvanicum)*	up to 6	4"	6-10	10"
Prickly Sida or Teaweed *(Sida spinosa)*	up to 6	3"	6-8	4"
Shepherdspurse *(Capsella bursa-pastoris)* ††	up to 6	4"	6-10	8"
Wild Mustard *(Brassica kaber)* (PNW)	up to 6	4"	6-10	10"
Wild Sunflower *(Helianthus annuus)*	up to 4	5"	4-6	8"

For additional weeds see Special Directions section following.

*Do not treat earlier than leaf stage shown and do not count cotyledon leaves.
**Basagran does not adequately control black nightshade (Solanum nigrum)
† If after the first application a second weed flush develops, re-treat according to this rate table.
†† Do not treat rosette before seed stalk appears.
PNW See special directions for Pacific Northwest.

Special Directions for Other Weed Problems in Peas.

Canada Thistle *(Cirsium arvense)*
Apply 1 quart of Basagran per acre when plants are from 8 inches tall to the bud stage. Make a second application at the same rate 7 to 10 days later.

Pacific Northwest (ID, OR, WA)
For control of cocklebur, and wild mustard, use only the 1 quart rate.

For cocklebur, treat when plants are in the 2-10 leaf stage and a maximum height of 10 inches.

For wild mustard, treat when plants are up to the 10 leaf stage and a maximum height of 10 inches.

ESTABLISHED PEPPERMINT AND SPEARMINT— Directions For Use

Apply Basagran early post-emergence when weeds are small and actively growing and before weeds reach the maximum size listed in the **Application Rate Table for Peppermint and Spearmint.**

Peppermint and spearmint are tolerant to Basagran, however, some leaf-burning may occur under certain conditions such as when plants are growing very actively and have extensive new, succulent tissue. Mint plants generally outgrow this condition within 10 days.

Irrigated Areas

In irrigated areas, it may be necessary to irrigate prior to Basagran treatment to ensure weeds are growing actively. Weeds growing under drought conditions or unseasonably cold weather usually are not satisfactorily controlled.

Restrictions and Limitations

Do not apply more than a total of 4 quarts of Basagran per acre in one season.

Application Rate Table for Peppermint and Spearmint

Weeds Controlled	1 Quart/Acre		2 Quarts/Acre	
	Leaf Stage	Max. Height	Leaf Stage	Max. Height
Common Lambsquarters* *(Chenopodium album)*	4-8 **	2"	—	—
Common Ragweed *(Ambrosia artemisiifolia)*	4-6 **	3"	—	—
Hairy Nightshade*** *(Solanum sarachoides)*	2-6	4"	6-10	6"
Kochia *(Kochia scoparia)*	NA **	4"	NA **	6"
Ladysthumb *(Polygonum persicaria)*	6-10	10"	—	—
Penna. Smartweed *(Polygonum pensylvanicum)*	6-10	10"	—	—
Wild Mustard *(Brassica kaber)*	6-10	8"	—	—
For additional weeds see Special Directions section following.				

*Control may be partial or inconsistent.
**Add oil concentrate according to the DIRECTIONS FOR USE—All Crops.
***Basagran does not adequately control black nightshade *(Solanum nigrum)*.
NA—not applicable.

Special Directions for Other Weed Problems in Peppermint and Spearmint

Yellow Nutsedge *(Cyperus esculentus)*
Apply 1 quart of Basagran per acre when plants are 6 to 8 inches tall. Make a second application at the same rate 7 to 10 days later. Add oil concentrate to the Basagran/water spray solution for each application according to the DIRECTIONS FOR USE—All Crops.

Canada Thistle *(Cirsium arvense)*
Apply 2 quarts of Basagran per acre when plants are from 8 inches tall to the bud stage. Make a second application at the same rate 7 to 10 days later.

Western Goldenrod *(Solidago occidentalis)*
Apply 2 quarts of Basagran per acre when plants are less than 8 inches tall. Make a second application at the same rate 7 to 10 days later.

Salsify *(Tragopogon spp.)*
Apply 2 quarts of Basagran per acre when plants are 4 to 8 inches tall. Make a second application at the same rate 7 to 10 days later. Add oil concentrate to the Basagran/water spray solution for each application according to the DIRECTIONS FOR USE—All Crops.

Common Groundsel *(Senacio vulgaris)*
Apply 1 to 1½ quarts of Basagran per acre when plants are less than 3 inches tall. Add oil concentrate to the Basagran/water spray solution according to the DIRECTIONS FOR USE—All Crops.

ESTABLISHED ORNAMENTAL TURF— Directions For Use

Basagran may be used on established bluegrass, fescue, bentgrass, bermudagrass, bahiagrass, centipedegrass, zoysiagrass, ryegrass, and St. Augustinegrass.

Timing of Applications

Apply Basagran herbicide post-emergence to yellow nutsedge when actively growing under good soil moisture conditions. If desired control is not obtained with the first application, make additional applications at intervals of 10-14 days. Do not apply more than 3 quarts per acre in one season.

In the northern United States, yellow nutsedge can emerge from May through July; whereas, in the southern United States, yellow nutsedge can emerge throughout the year. Therefore, initial applications should be planned when most plants have emerged. If new yellow nutsedge plants emerge later in the season, make additional applications of Basagran in accordance with these label directions. In unmowed turf, make first application after emergence but before yellow nutsedge is 8 inches tall. Thorough spray coverage of yellow nutsedge is essential for maximum control.

For optimum control do not mow 3-5 days before or after application.

Application Conditions

Water volume: Minimum of 1 gal./1000 square feet or 40 gallons per acre.

Spray pressure: Minimum of 40 psi.

Equipment: Use any spray equipment customarily used for spraying pesticides on turf. Clean equipment carefully before using Basagran. Rinse with water after use.

Restrictions and Limitations

Do not apply Basagran to any newly seeded or newly sprigged turf until seedlings or sprigs are well established, as injury may result.

Do not apply Basagran to golf course greens or collars.

When treating turf with Basagran avoid over-the-top spraying of adjacent ornamental trees, shrubs, and flowers. Spraying near the base of established ornamental trees, shrubs, and flowers should not result in injury.

Application Rate Table for Ornamental Turf

Weed Controlled	Application Rate*	
	Fluid Oz. Per 1000 Sq. Ft.	Quarts Per Acre
Yellow Nutsedge *(Cyperus esculentus)*	¾ to 1½	1 to 2

*If needed, make subsequent applications at 10-14 day intervals until yellow nutsedge is eliminated. Apply no more than 3 quarts per acre in one season.

Conditions of Sale and Warranty
The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF WYANDOTTE CORPORATION ("BWC") or the Seller. All such risks shall be assumed by the Buyer.

BWC warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use, subject to the inherent risks referred to above. BWC MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY. In no case shall BWC or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. BWC and the Seller offer this product, and the Buyer and user accept it, subject to the foregoing Conditions of Sale and Warranty which may be varied only by agreement in writing signed by a duly authorized representative of BWC.

BASF Wyandotte Corporation

BASF

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POAST® POST-EMERGENCE GRASS HERBICIDE - UPDATE

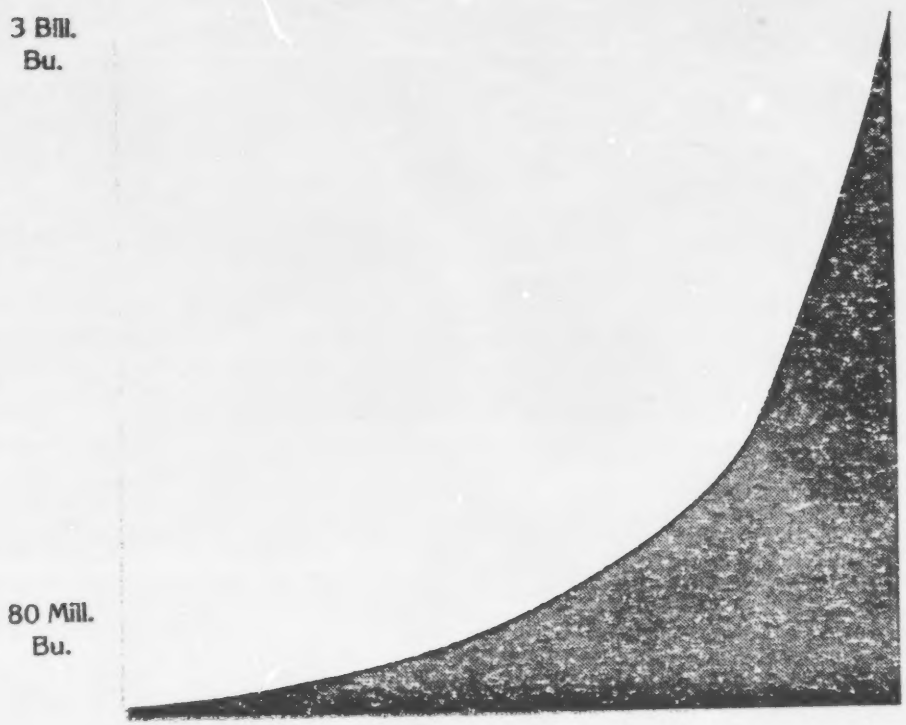
Poast herbicide, BASF Wyandotte's exciting new postemergence grass herbicide, was extensively evaluated in soybeans under an Experimental Use Permit ("EUP") in 1981. These tests have indicated that Poast is unique in that it consistently controls literally all annual and perennial grasses with excellent selectivity to soybeans and other broadleaf crops.

Poast will be sold on a limited scale in 1982 under an expanded EUP. All field applications will be carefully monitored by participating growers and BASF personnel. Full registration for use on soybeans is expected in time for the 1983 season.

Poast has shown exceptional promise for control of perennial grasses such as rhizome johnsongrass and quackgrass, and annual grasses such as foxtail, proso millet, crabgrass, barnyardgrass, shattercane and volunteer corn in soybeans. Future plans include registration on other leading broadleaf crops, including alfalfa, sugarbeets, cotton and peanuts.

Interest in Poast herbicide for grass control in conventional soybean production has been very high. But this interest has been expanded even more by the possibilities it offers in conservation tillage (reduced, minimum and no till practices), as well as in solid seeding.

Soybean Success Saga



BASF 1-1

American Soybean Association 1982

Estimated Cost Per Acre For Growing Soybeans

	1980 Iowa Cost (36 Bu/A)		Local Estimate
Growing			
Chopping		$ 4.59	_____
Discing		5.56	_____
Plowing		7.54	_____
Harrowing		1.14	_____
Planting		5.15	_____
Hoeing		3.44	_____
Cultivating		2.86	_____
P & K Bulkspread		.92	_____
Misc. Machinery		1.83	_____
	Total	$33.03	$
Harvesting			
Combining		$12.69	_____
Hauling		1.56	_____
Handling		1.23	_____
	Total	$15.48	$
Seed, Chemicals			
Seed		$13.00	_____
Fertilizer		16.60	_____
Herbicide		14.50	_____
	Total	$44.10	$
Overhead (Ins. Etc.)		$10.50	$ _____
Labor		$13.90	$ _____
Hand Weeding		$ 4.00	$ _____
TOTAL NON-LAND COSTS		$121.01	$ _____
Cash Rent Or Land Charge		$112.00	$ _____
TOTAL COST/ACRE		$233.01	$ _____
TOTAL COST/BUSHEL		$ 6.47	$ _____

BASF 1-2

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Based On 1980 ISU Data

Estimated Income From Raising Soybeans

Yield/Acre _____ Bushels

Estimated Price/ Bushel

Optimistic $ _____

Pessimistic $ _____

Average $ _____

Gross Income/Acre $ _____

Expenses/Acre $ _____

Net Income/Acre $ _____

BASF 1-3
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Produce Soybeans For $5/Bushel

	Soybeans - bu./A.			
	30	40	50	60
Fixed Cost $ /A	$211	$211	$211	$211
Variable Cost	$ 56	$ 64	$ 73	$ 83
Total Cost	$267	$275	$284	$294
Production Cost/Bu.	$8.90	$6.88	$5.68	$4.90
Profit/A ($8 Beans)	-$27	$45	$116	$186
($7 Beans)	-$57	$5	$66	$126

Illinois Data

BASF 1-4

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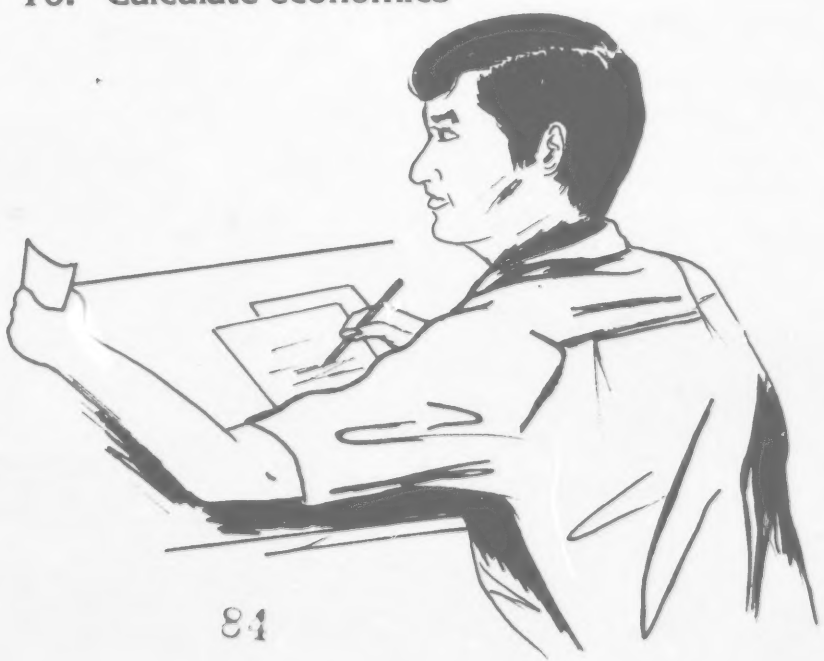
How To Set Up A High Yield Area

1. Two or more varieties
2. Appropriate tillage
3. Proper aglime level
4. High level of P & K
5. Other nutrients as needed
6. Proper spacing and population
7. Pest control
8. Plant on time
9. Careful harvest
10. Calculate economics



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Management System For Maximum Production

Double Cropping

Improve Marginal Land

Weed Control

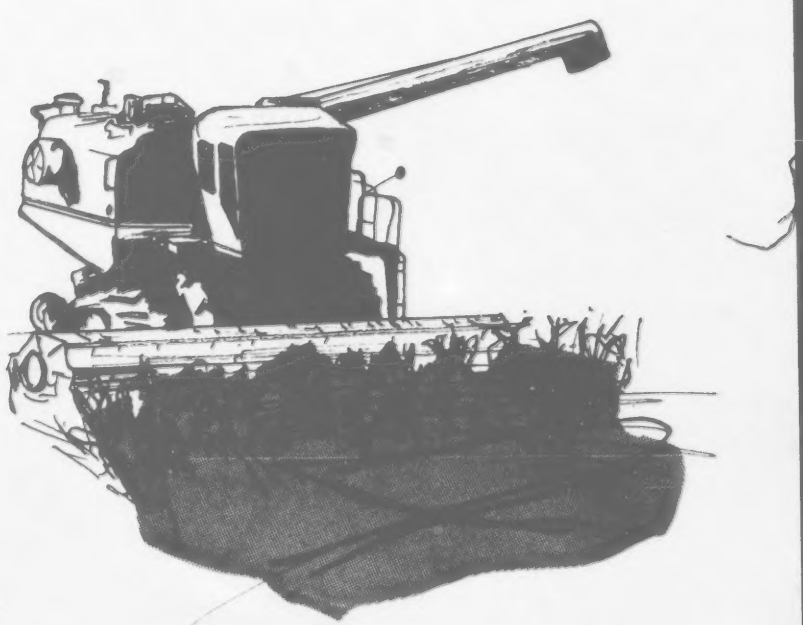
Water Management
A. drainage
B. irrigation

Soil Compaction

Correct Fertility

Disease & Nematode Control

Variety Selection



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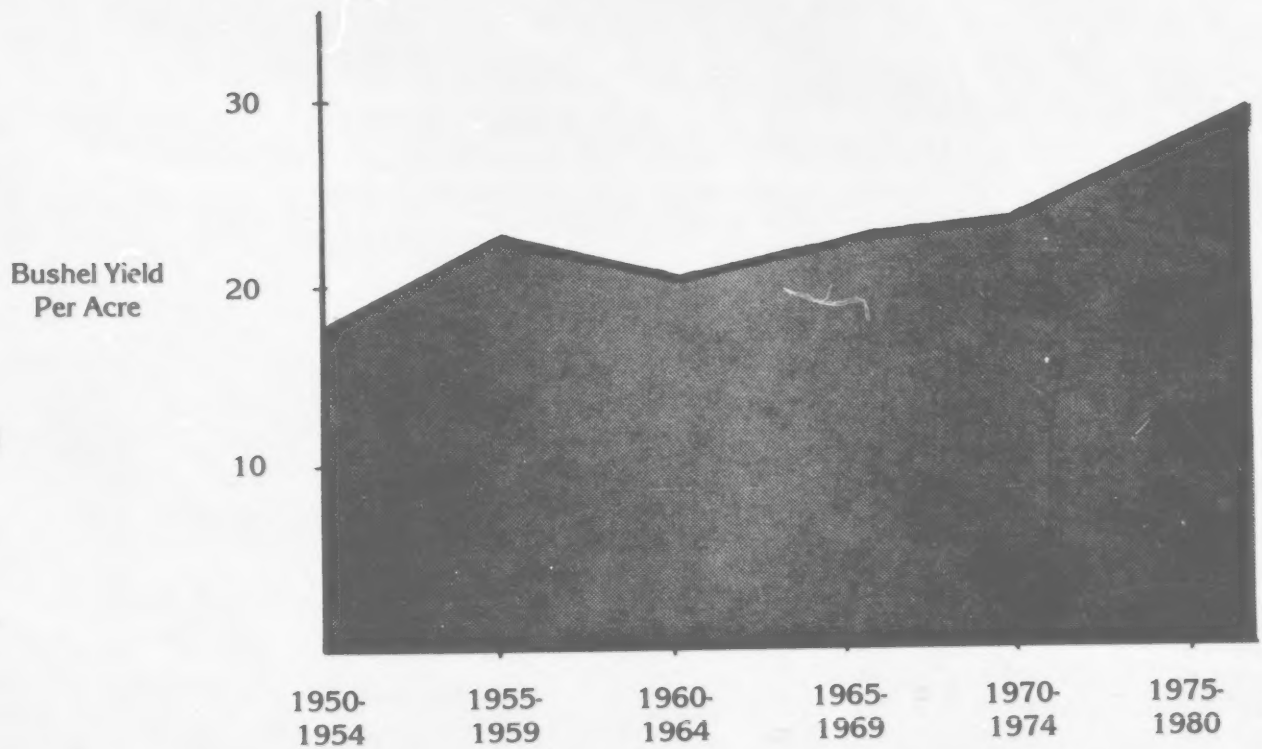
Soybean Yield Per Acre



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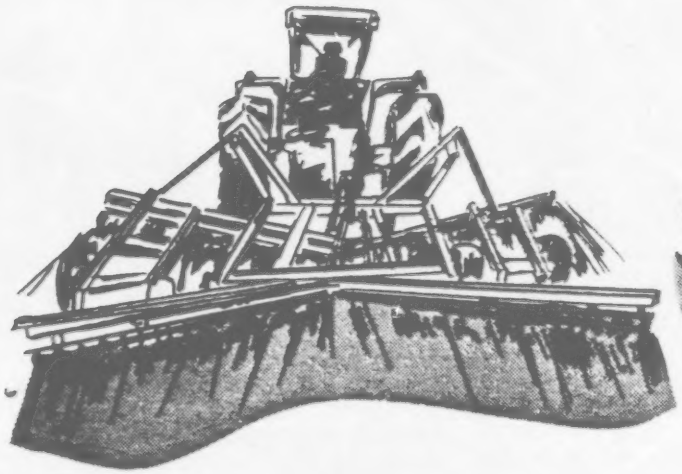
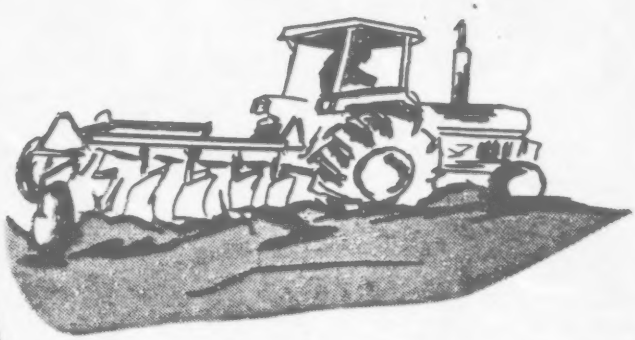
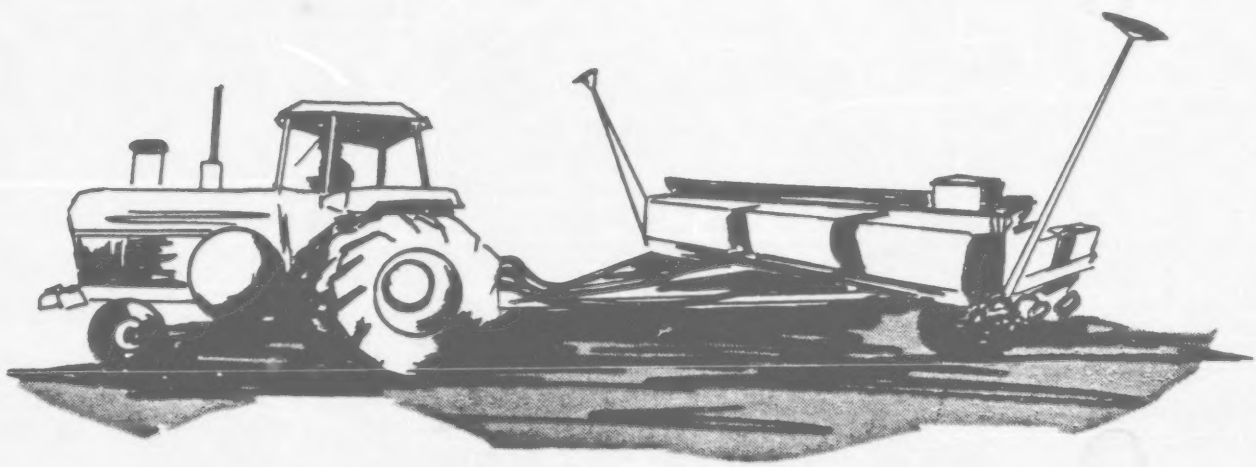
Good Seedbeds Are Made - They Do Not Just Happen.







BASF 2-1

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What Factors Affect The Selection Of A Seedbed?

BASF 2-2
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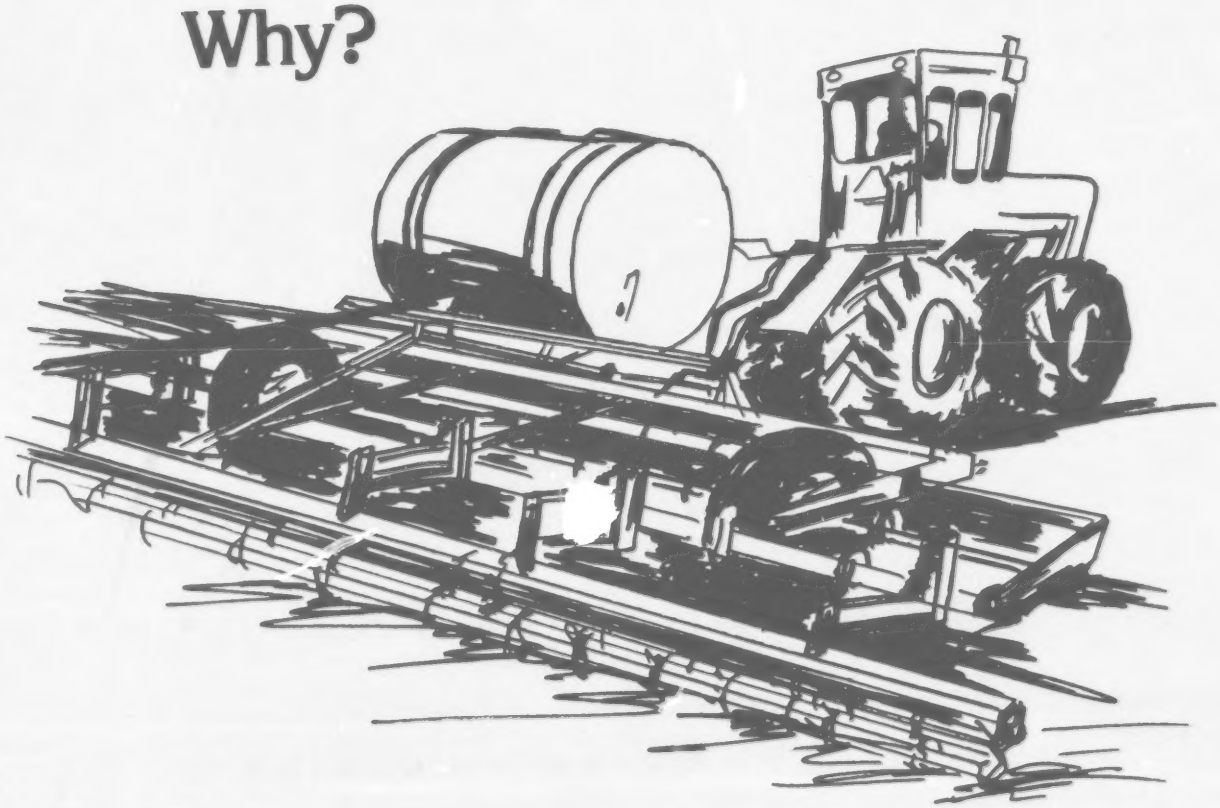
Which Tillage System Is The Most Popular Today?

Which Will Be The Most Popular 5-10 Years From Now?

Why?



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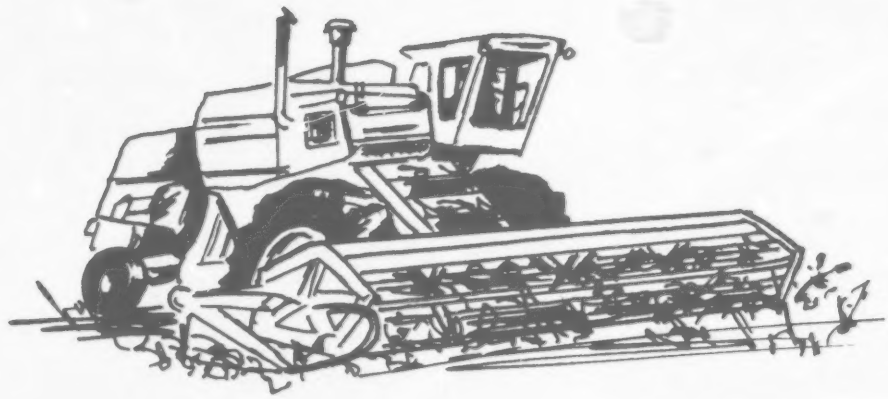
Soil Fertility
Is Important
For High Crop Yields

How Can You Tell If You Have High Soil Fertility?



BASF 3-1
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Soil Samples Must Be Taken At Least Once During Each Rotation (Every 4 Years)

BASF 3-2
©American Soybean Association 1982

Soybeans Aglime

1. Improves growth of nodule-forming bacteria on soybean roots.

2. Favors growth of soil organisms which decay plant residues, which frees plant nutrients.

3. Increases availability of all plant nutrients.

Maintain soil pH of 6.5 - 7 for soybeans. (Legumes)

BASF 3-3
American Soybean Association 1982

Which Soybean Variety Is Best?

Factors to consider:

- **Yield**
- **Row spacing**
- **Maturity**
- **Soil type**

- **Which Varieties Are Popular In This Area?**

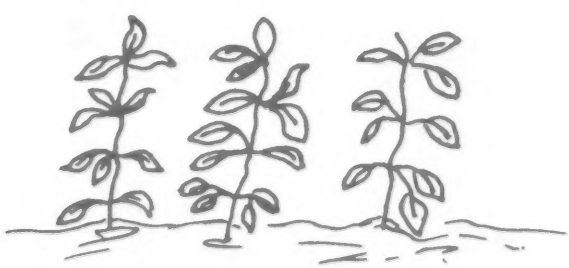
1.

2.

3.

4.

- **How do They Yield In An Independent Yield Test?**



BASF 4-2

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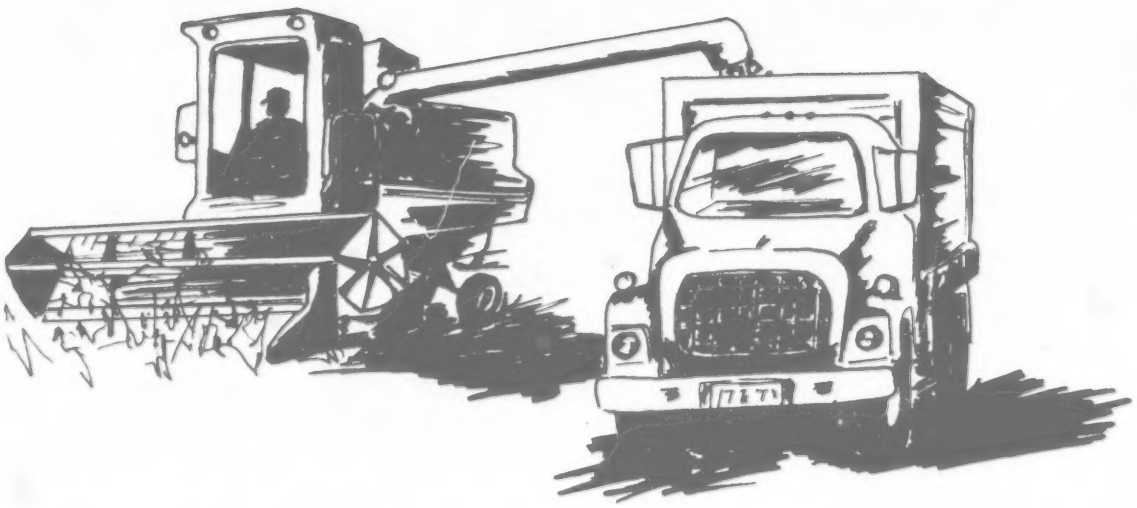
Why Plant More Than One Variety Of Soybeans?



BASF 4-3
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What Seed Quality Factors Are Important?

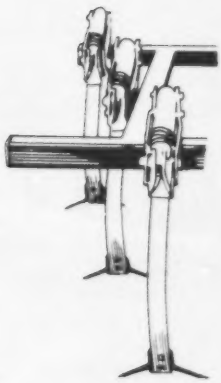
BASF 4-4
©American Soybean Association 1982

• Why Is Germination And Seedling Vigor Important?

BASF 4-5
©American Soybean Association 1982

Weed Control Is A Must For Profitable Soybean Production.

Tillage



Canopy

Herbicide

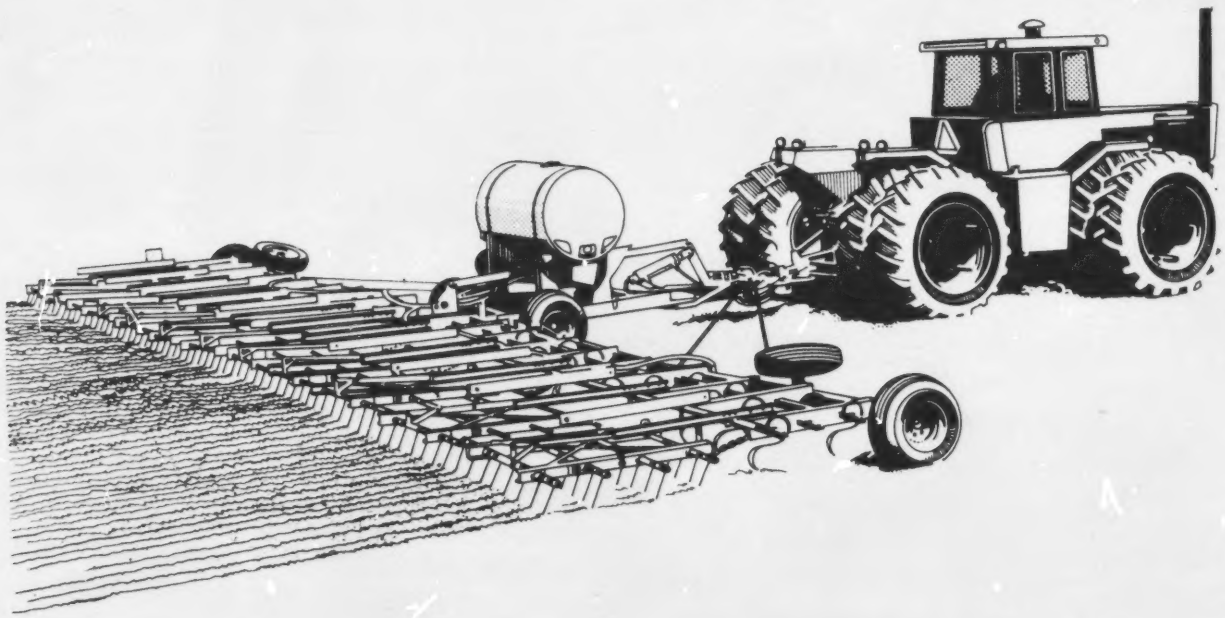
Top Farmers Have Improved Their Management In Three Areas. Can You Explain How?

BASF 5-1
©American Soybean Association 1982

TILLAGE

The Place To Start With Good Weed Control

- Thoroughly mix pre-emerge chemicals
- Prepare a good seedbed (stand is all-important.)
- Wheel tracks must be removed prior to planting
- Rotary hoe to break crust
- Cultivate if not solid seeded.



BASF 5-2

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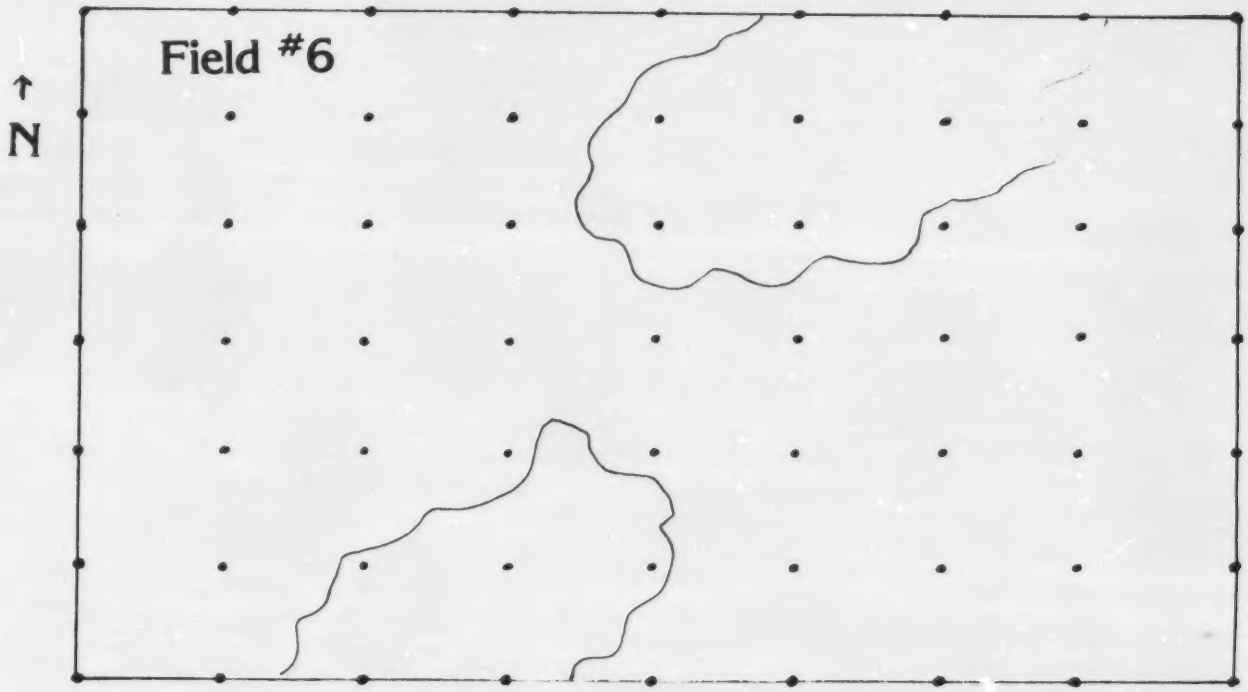

Weed Map Can Help Match Herbicide To Weed Problem

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Soybean Herbicide Programs Tend To Be The Same In Different Areas. Which Program Is Popular Here?

Program 1		Program 2		Program 3	
Herbicide	Rate	Herbicide	Rate	Herbicide	Rate

©American Soybean Association 1982

A Weed Control SYSTEM To Raise Clean Beans

Tillage

_____

_____

_____

_____

+

Herbicide Program

_____

_____

_____

_____

+

Canopy

_____

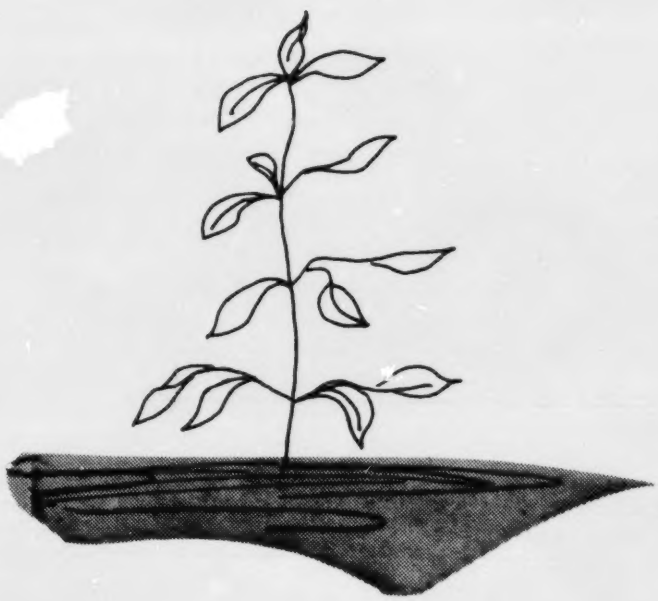
_____

+

Hand

_____

_____



BASF 5-5

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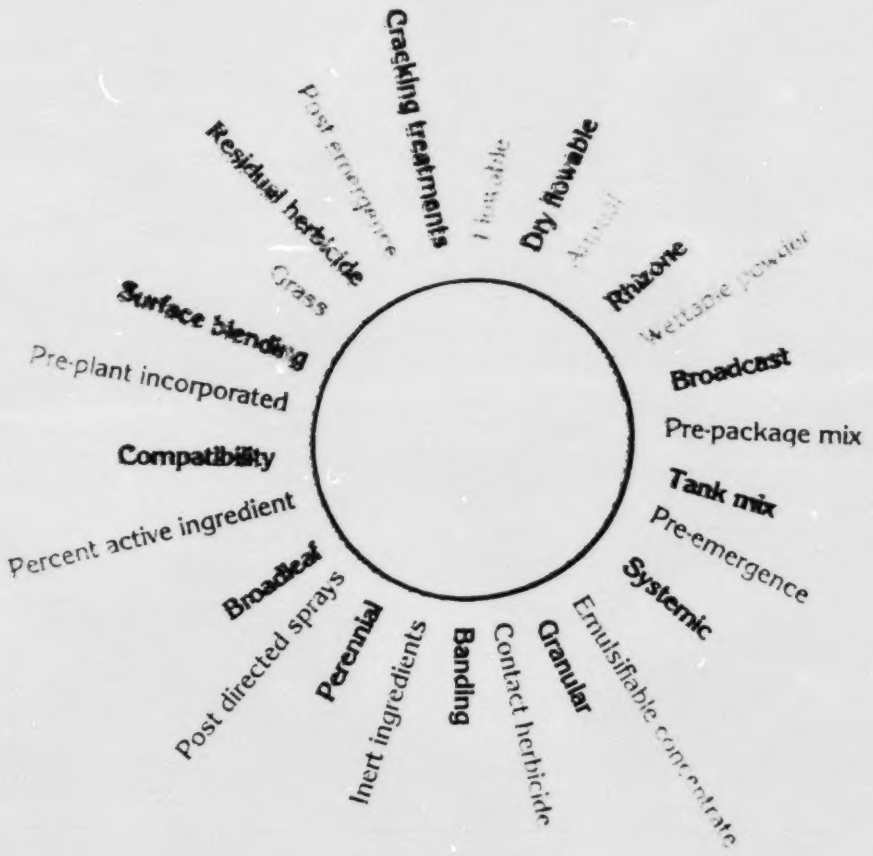
The Herbicide Definition Game

Team 1

Team 2



Association 1982

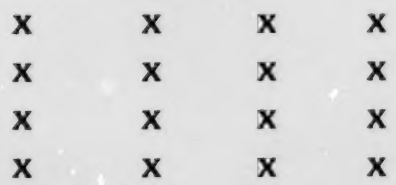
Soybean Planting Systems Are Changing

Wide Rows
36″-40″

a. Cultivated

b. Plant with corn planter

Narrow Rows
15″-30″

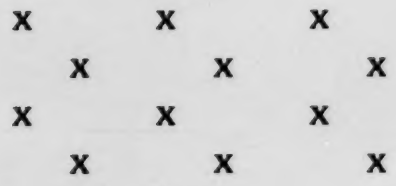


a. Cultivated

b. 30″ rows for tractor tires

c. May use corn planter or soybean special

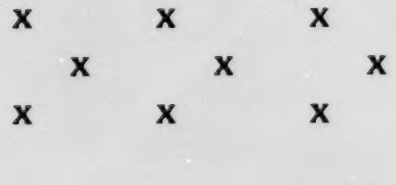
Solid Seeded
6″-12″



a. No cultivation

b. Drill or broadcast

Till Planting



a. Plant in wheat stubble

b. Drill

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Which Way Should You Plant? Drill, Soybean Special, or With A Corn Planter?

Less than 150 acres of soybeans _____
generally cheaper to use corn planter.

200-500 acres of soybeans

Step 1 Determine cost of drill or soybean special. $ _____

Step 2 Determine ownership cost/yr. 20% of purchase price. $ _____

Step 3 Determine extra cost to own 2 planting units. $ _____

$$\left(\frac{\text{Step 2}}{\text{Soybean Acres}}\right)$$

Step 4 Determine expected extra income $ _____

(3 to 6 bushels x $_____/bu.)

600 acres or more of soybeans

Step 1 Cost of drill x 20% = $ _____

(Annual cost but one less corn planter used.)

Step 2 Determine extra income potential from 3-6 bu/a. $ _____

BASF 6-2

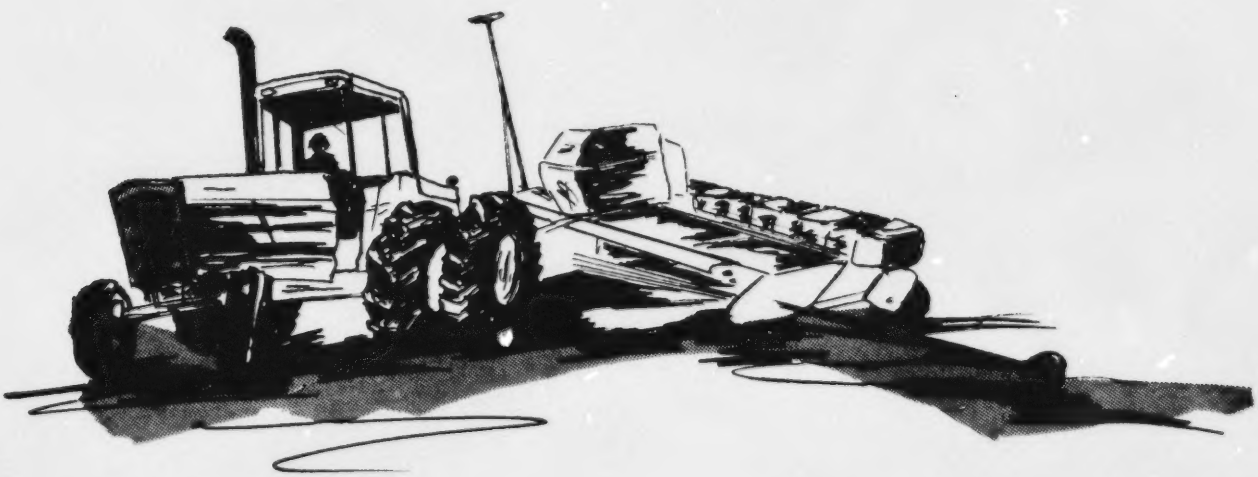
©American Soybean Association 1982

Solid Seeded Or Narrow Row Soybeans Cost More To Produce.

Drill or Soybean Special	Example	My Cost
20' Unit Machine.	$9000	
Fixed Cost 20% 1 Year	$1800	
Fixed Cost/Acre $1800 ÷ 400 acres	$4.50/A.	
Herbicide - - Extra Cost To Broadcast	$8/A.	
Seed - - Extra Cost To Plant Thicker	$2/A.	
Total Extra Costs	$14.50/A.	

BASF 6-3
American Soybean Association 1982

When Should Soybeans Be Planted?



BASF 6-4
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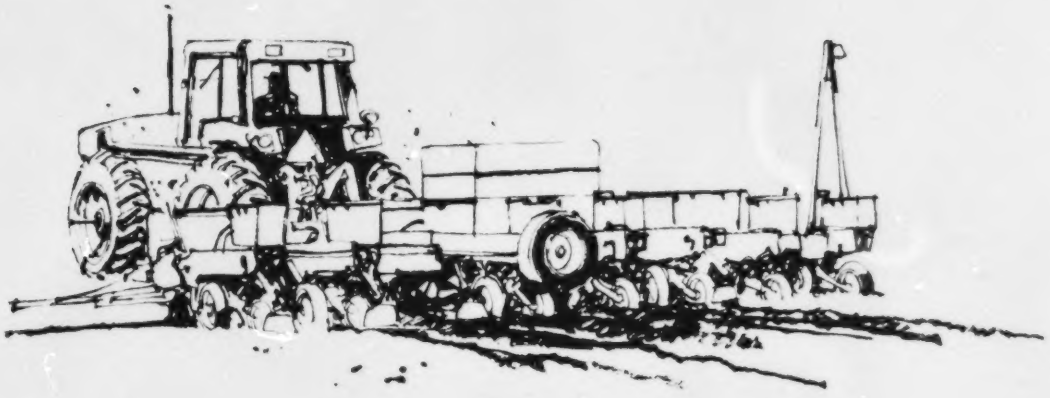
Better Herbicides Have Changed The Soybean Planting System

1 - Allowed soybeans into the rotation.

2 - Earlier planting.

3 - Reduced or eliminate cultivation.

4 - Use the soybean canopy to control weeds.



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Trouble Shooting Soybean Problems!

BASF 7-1

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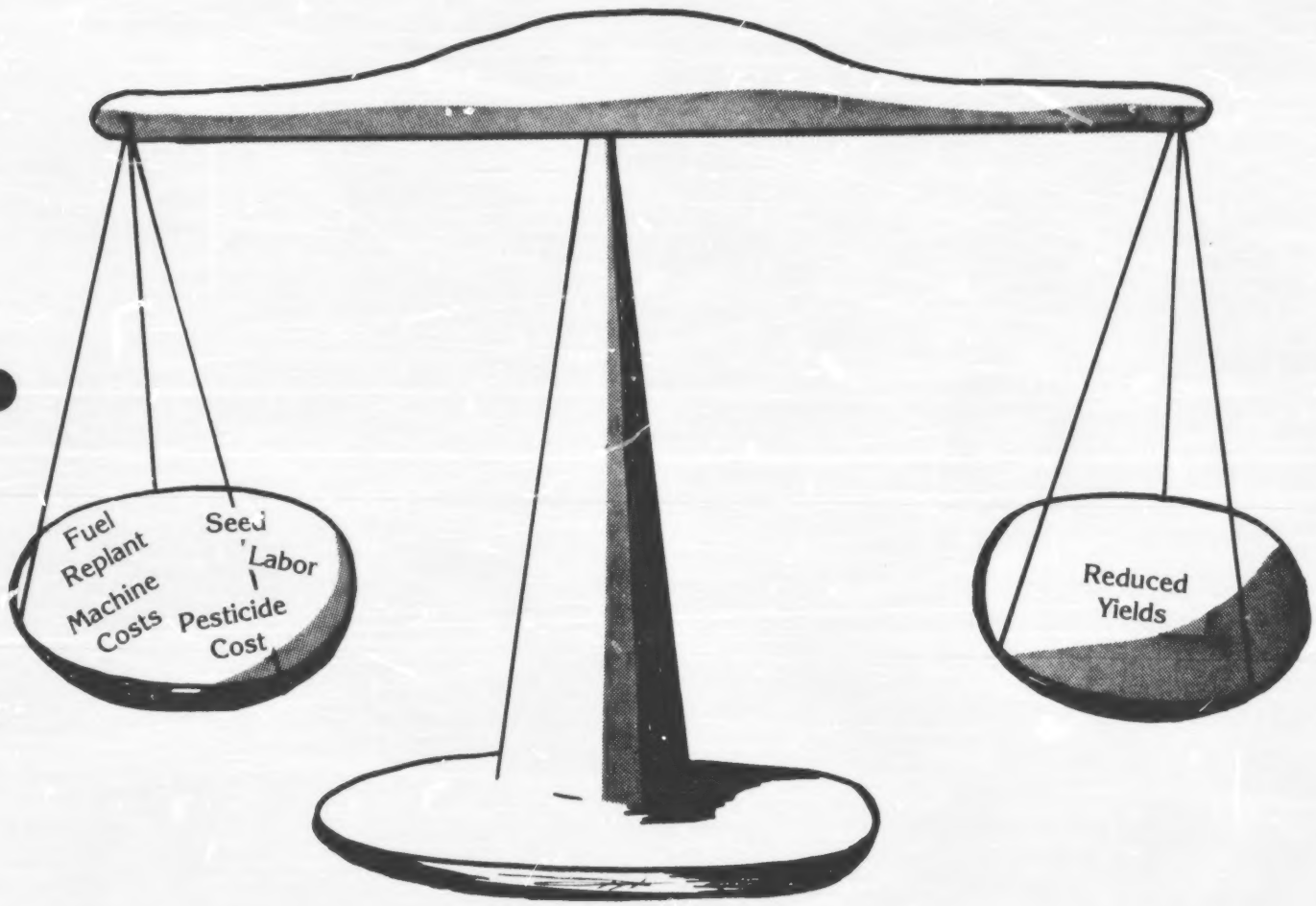
Top Soybean Management Rewards The Correct Reaction To Soybean Troubles. Weigh The Costs - - Weigh The Damage.



BASF 7-2

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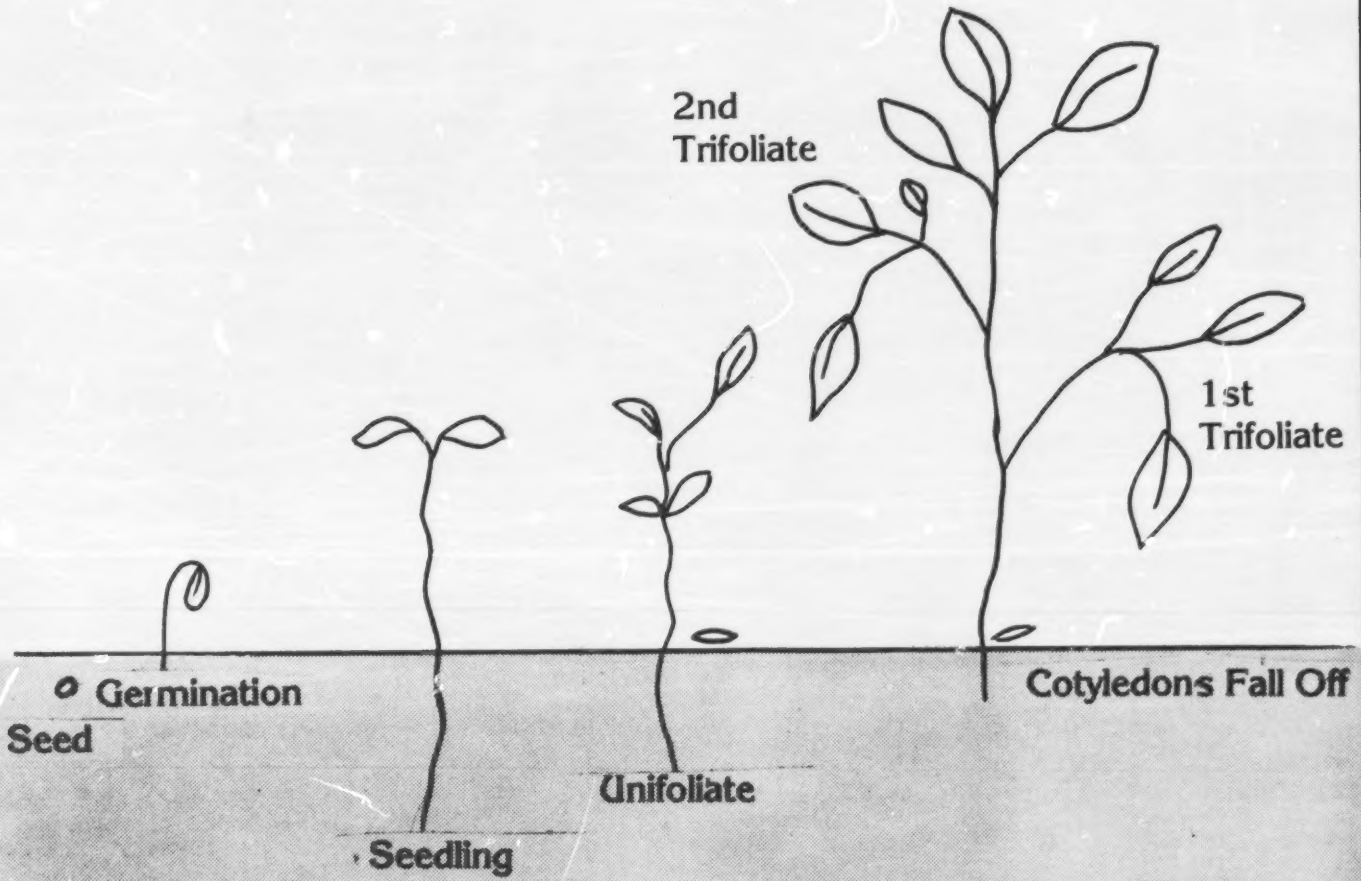
Stages Of Growth Of The Soybean Plant



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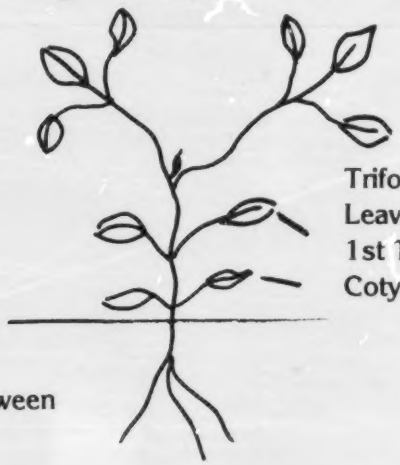
Postemergence Chemicals Must Be Timed Correctly.

Read and Follow Labels.

Apply Early - - Before The Weeds & Soybeans Are Too Large.

Consider Crop Oil As A Wetting Agent.



Trifoliate Has 3 True Leaves Per Stem.
1st True Leaves (2) Cotyledons

Spray When Beans Are Between The 1st and 3rd Trifoliate.

BASF 7-4

©American Soybean Association 1982

Which Is Best - - Prevention Or Treatment?

Possible Problem

Insects

_____ _____

_____ _____

Diseases

_____ _____

_____ _____

_____ _____

Weeds

_____ _____

_____ _____

_____ _____

_____ _____

Nematodes

_____ _____

Nutrient Shortages

_____ _____

_____ _____

Hail

_____ _____

pH

_____ _____

Pesticide Damage

_____ _____

_____ _____

_____ _____

Flooding

_____ _____

Drought

_____ _____

Late Frost

_____ _____

Early Frost

_____ _____

BASF 7-5
©American Soybean Association 1982

Double Cropping
Will It Make Money?

• Double Cropping Requires Tillage Which System Is The Best?

No-till

Interseeded

Minimum Till

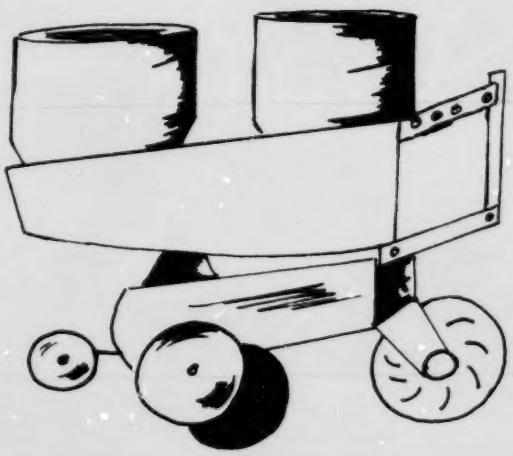
•

Conventional

•

BASF 8-2
©American Soybean Association 1982

Good Seed Beds Are Still Important When Double Cropping

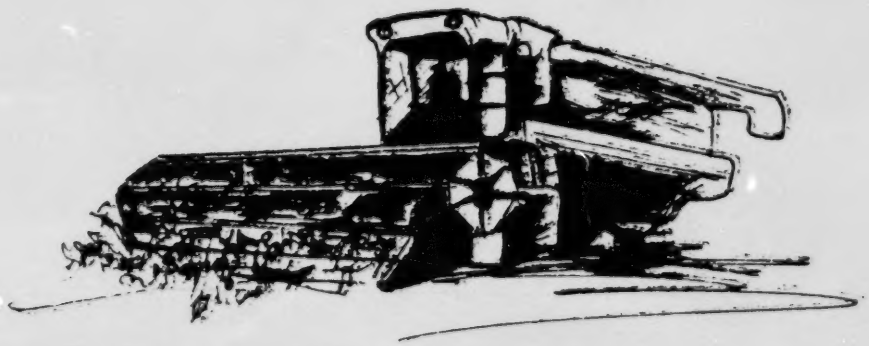


Soil To Seed Contact a Must - - Soil Moisture Is Needed

BASF 8-3
©American Soybean Association 1982

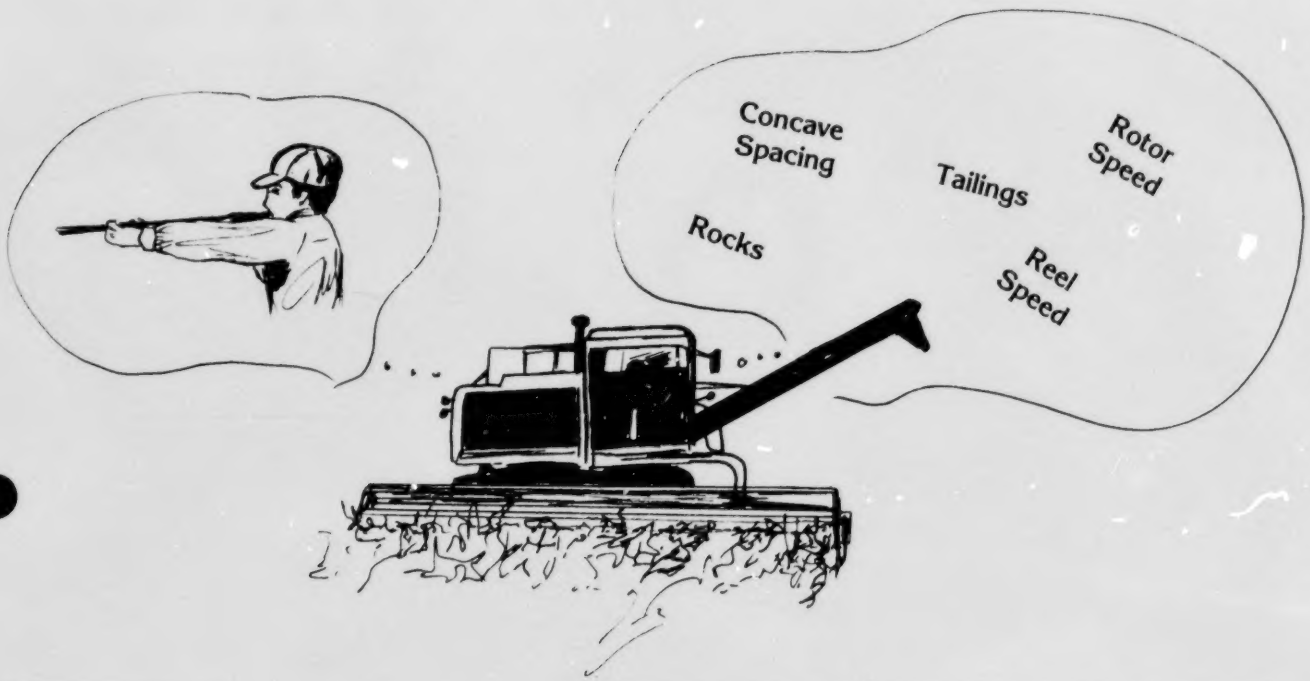
Make A List To Be Sure You Are Ready To Harvest Before Harvest

Job To Do	Completed
1. Repair Grain Auger	
2.	
3.	
4.	
5.	
6.	
7.	



BASF 9-1

Harvest Losses Can Be Kept To A Minimum By Operating The Combine Carefully.



An Operator Thinks About Combining. A Combine Driver Thinks About Everything.

BASF 9-2

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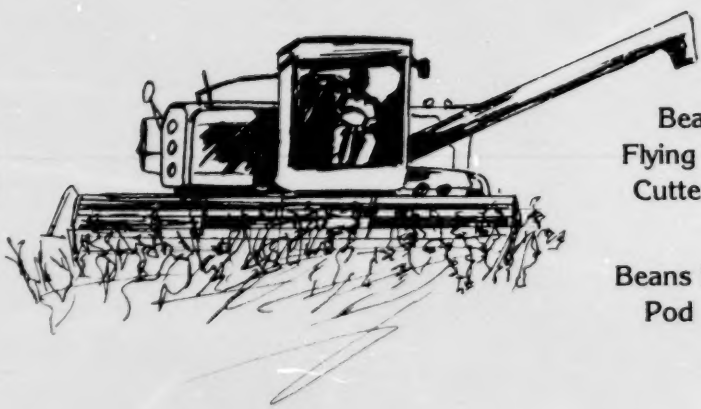
• Soybean Fields Can Talk But You Must Know Their Language And Listen



BASF 9-3

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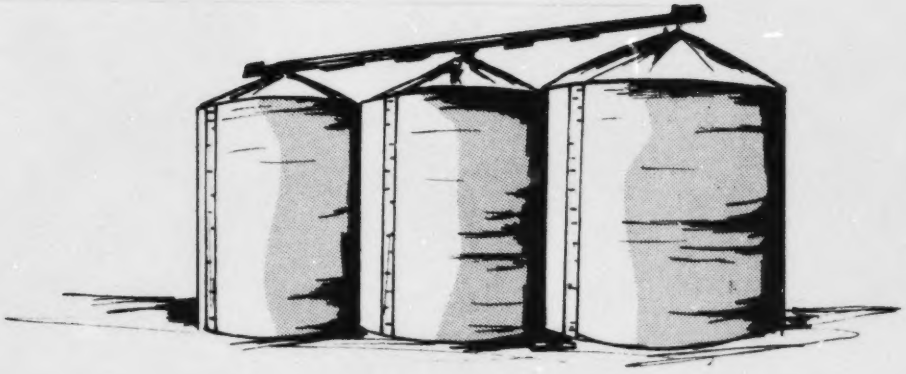
What Are The Storage Options For The Soybean Producer?

1 -

2 -

3 -

4 -



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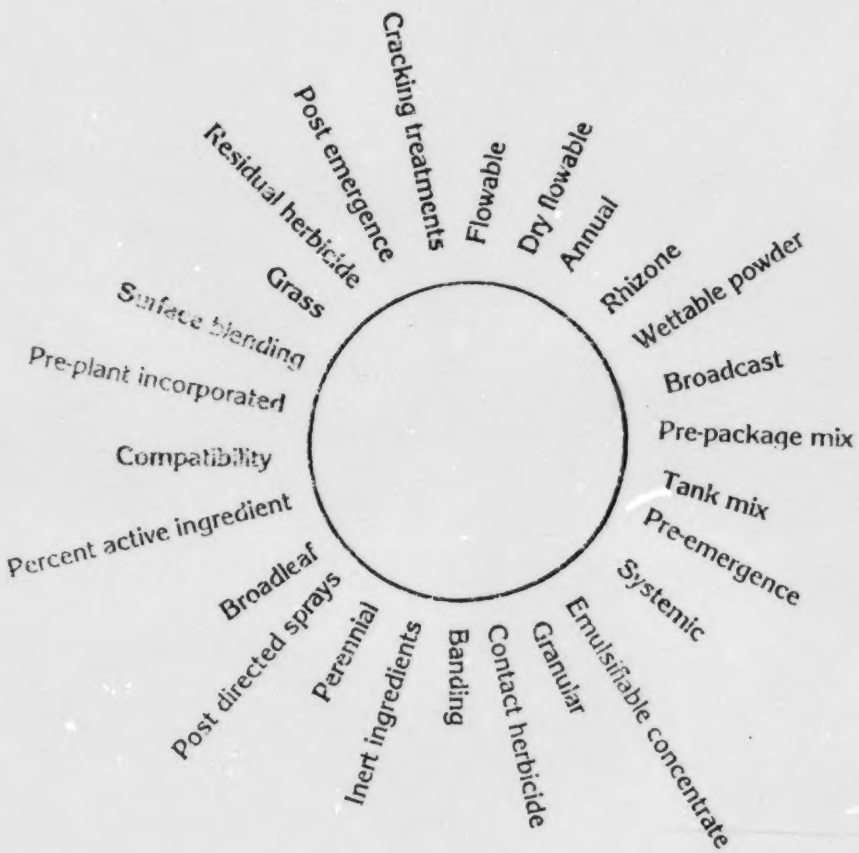
The Herbicide Definition Game

Team 1

Team 2



BASF 5-6
American Soybean Association 1982

Soybeans Aglime

1. Improves growth of nodule-forming bacteria on soybean roots.

2. Favors growth of soil organisms which decay plant residues, which frees plant nutrients.

3. Increases availability of all plant nutrients.

Maintain soil pH of 6.5 - 7 for soybeans. (Legumes)

BASF 3-3
American Soybean Association 1982

Which Soybean Variety Is Best?

Factors to consider:

- Yield
- Row spacing
- Maturity
- Soil type

BASF 4-1
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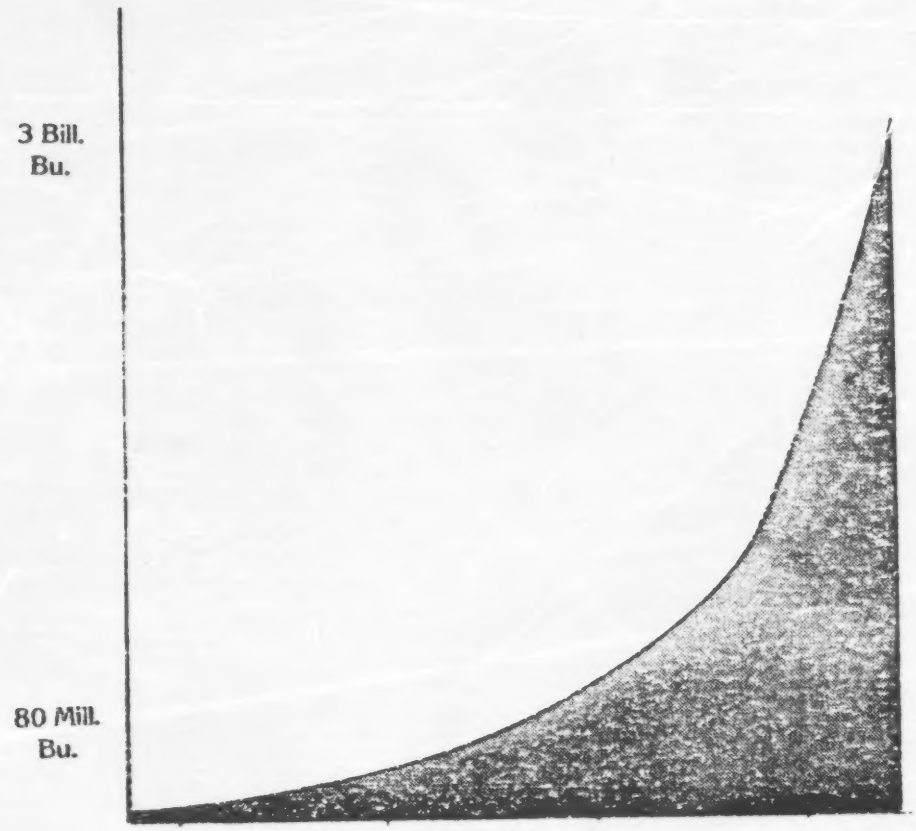
Soybean Success Saga



BASF 1-1

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Estimated Cost Per Acre For Growing Soybeans

	1980 Iowa Cost (36 Bu/A)		Local Estimate
Growing			
Chopping		$ 4.59	
Discing		5.56	
Plowing		7.54	
Harrowing		1.14	
Planting		5.15	
Hoeing		3.44	
Cultivating		2.86	
P & K Bulkspread		.92	
Misc. Machinery		1.83	
	Total	$33.03	$
Harvesting			
Combining		$12.69	
Hauling		1.56	
Handling		1.23	
	Total	$15.48	$
Seed, Chemicals			
Seed		$13.00	
Fertilizer		16.60	
Herbicide		14.50	
	Total	$44.10	$
Overhead (Ins. Etc.)		$10.50	$
Labor		$13.90	$
Hand Weeding		$ 4.00	$
TOTAL NON-LAND COSTS		$121.01	$
Cash Rent Or Land Charge		$112.00	$
TOTAL COST/ACRE		$233.01	$
TOTAL COST/BUSHEL		$ 6.47	$

BASF 1-2

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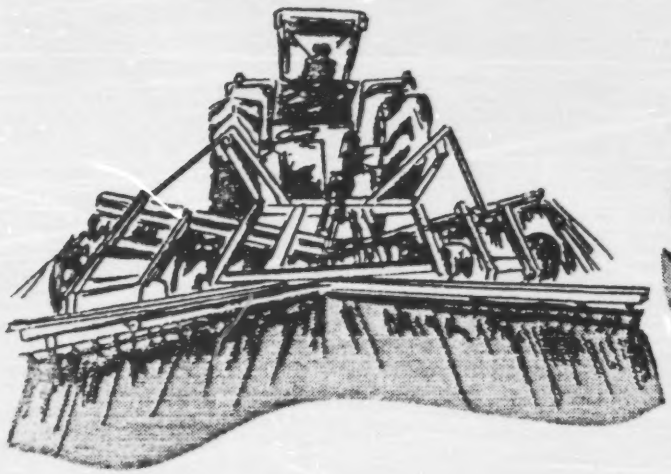
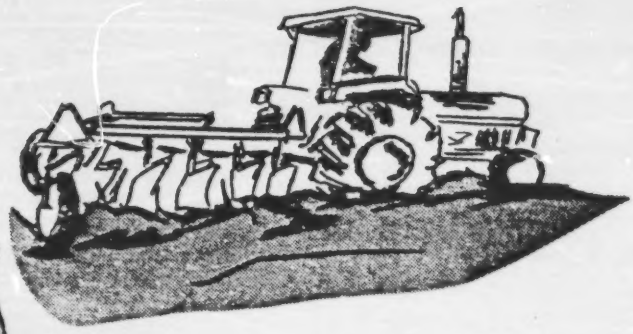
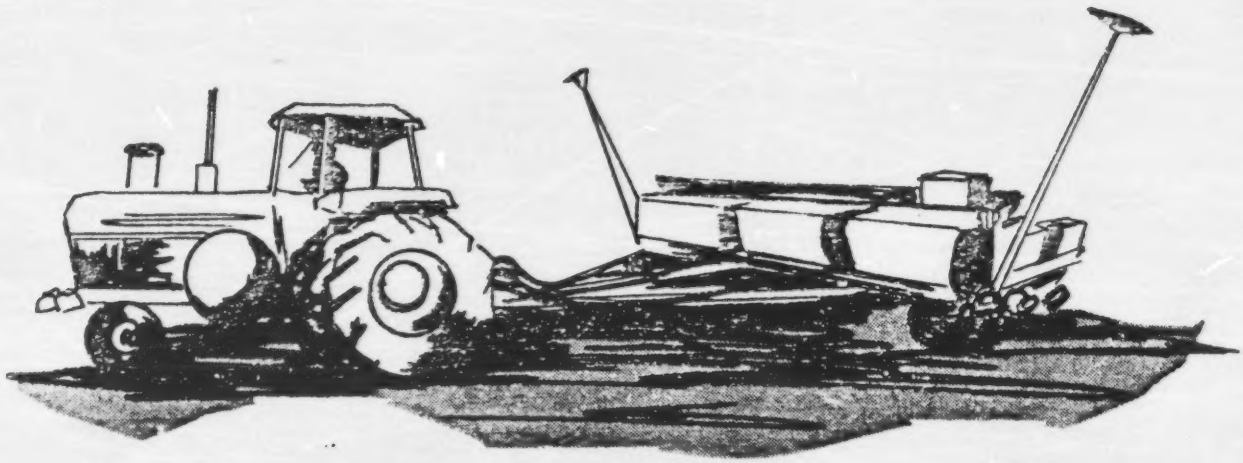
Based On 1980 ISU Data

Good Seedbeds Are Made - They Do Not Just Happen.







BASF 2-1

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Solid Seeded Or Narrow Row Soybeans Cost More To Produce.

Drill or Soybean Special	Example	My Cost
20' Unit Machine.	$9000	
Fixed Cost 20% 1 Year	$1800	
Fixed Cost/Acre $1800÷400 acres	$4.50/A.	
Herbicide - - Extra Cost To Broadcast	$8/A.	
Seed - - Extra Cost To Plant Thicker	$2/A.	
Total Extra Costs	$14.50/A.	

BASF 6-3

American Soybean Association 1982

Which Is Best - - Prevention Or Treatment?

Possible Problem

Insects

_____ _____

_____ _____

Diseases

_____ _____

_____ _____

_____ _____

Weeds

_____ _____

_____ _____

_____ _____

_____ _____

Nematodes

_____ _____

Nutrient Shortages

_____ _____

_____ _____

Hail

_____ _____

pH

_____ _____

Pesticide Damage

_____ _____

_____ _____

_____ _____

Flooding

_____ _____

Drought

_____ _____

Late Frost

_____ _____

Early Frost

_____ _____

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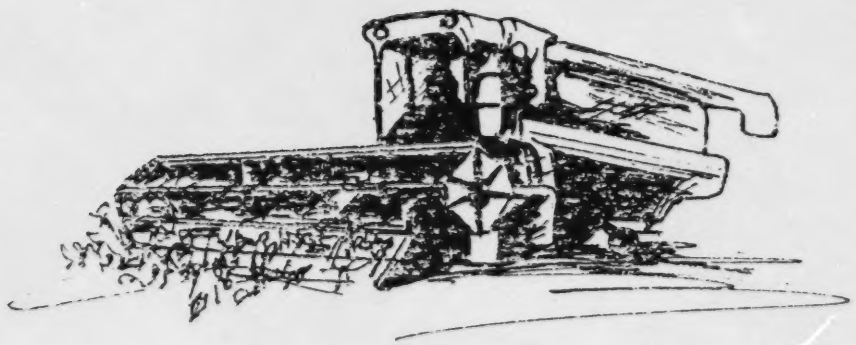
Double Cropping
Will It Make Money?

Make A List To Be Sure You Are Ready To Harvest Before Harvest

Job To Do	Completed
1. Repair Grain Auger	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____



Miracle Crop

Oil Products

Glycerol

Fatty Acids

Sterols

Refined Soy Oil

EDIBLE USES

- Cooking Oils
- Mayonnaise
- Margarine
- Pharmaceuticals
- Salad Dressings
- Salad Oils
- Sandwich Spreads
- Vegetable Shortening
- Mellorine
- Medicinals
- Filled Milks
- Coffee Whiteners
- Creamers
- Liquid Shortening

TECHNICAL USES

- Caulking Compounds
- Core Oils
- Disinfectants
- Electrical Insulation
- Insecticides
- Fungicides
- Herbicides
- Pesticides
- Linoleum Backing
- Oiled Fabrics
- Printing Inks
- Protective Coatings
- Plasticizers
- Putty
- Soap
- Tin & Terne Plate Oils
- Waterproof Cement
- Wallboard Mfr.

Soybean Lecithin

- Emulsifying Agent
  - Bakery Products
  - Candy Products
  - Chocolate Coatings
  - Pharmaceuticals
- Nutritional
  - Medical Use
  - Dietary Use
- Anti-Spattering Agen
  - Margarine Mfr.
- Stabilizing Agent
  - Shortening
- Anti-Foam Agent
  - Yeast Manufacture
  - Alcohol Manufactu
- Dispersing Agent
  - Paint Manufacture
  - Ink Manufacture
  - Insecticides
  - Rubber Mfr.
- Wetting Agent
  - Cosmetics
  - Pigments (paint)
  - Calf Milk Replacers

# of Many Uses

SOYBEANS

Whole Soybean Products

Baked Soybeans

Seed

Soy Sprouts

Stock Feeds

Full Fat Soy Flour

Bread
Candy
Doughnut Mix
Frozen Desserts
Pancake Flour
Pan Grease Extender
Pie Crust
Sweet Goods
Low-Cost Gruels
Infant Milk Drinks

Roasted Soybeans

Candy Ingredient
Confection
Cookie Ingredient
Cookie Topping
Cracker Ingredient
Fountain Topping
Soy Coffee
Soynut Butter
Spite Base
Dietary Items

Soybean Derivatives

Oriental Foods

Soybean Meal Products

Soy Flour Concentrates & Grits

EDIBLE USES

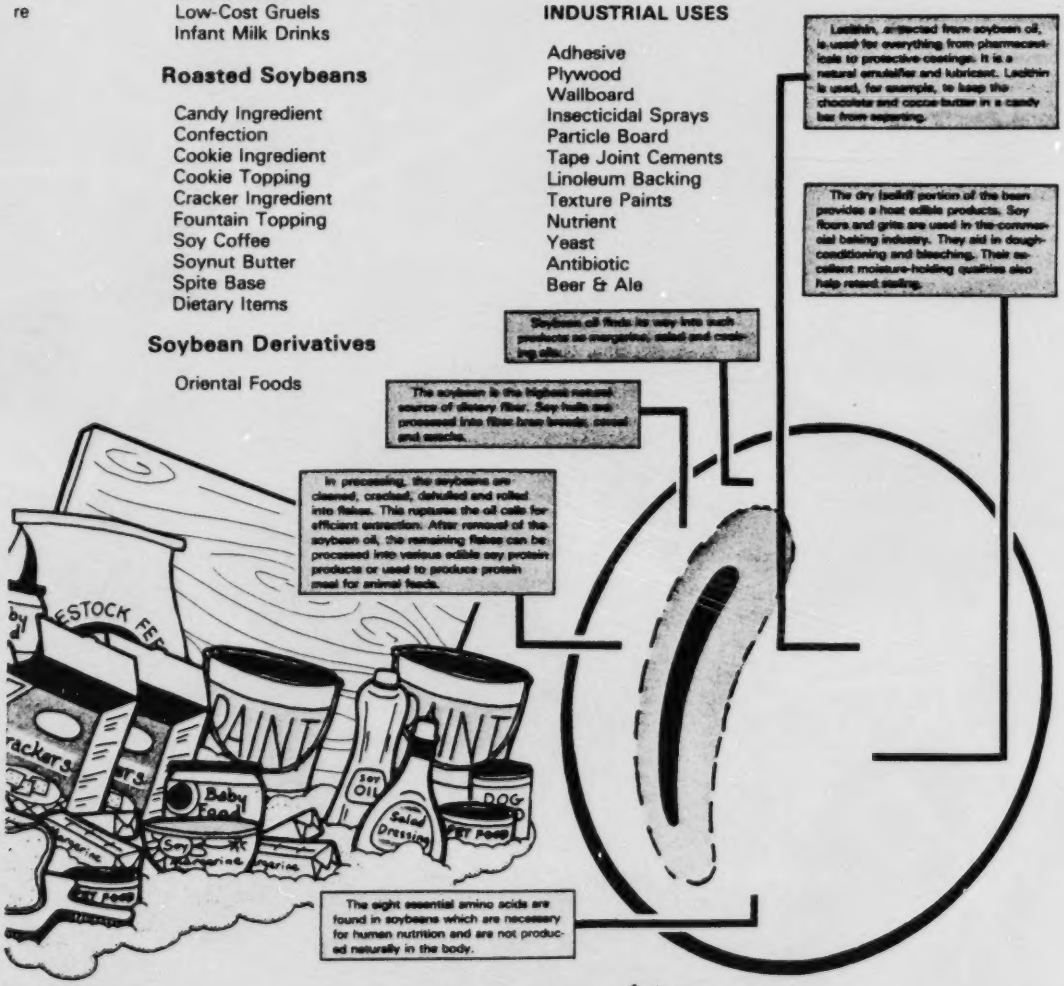
Bakery Ingredient
Alimentary Pastes
Noodles
Meat Products
Cereals
Prepared Mixes
Food Drinks
Baby Food
Hypo-allergenic Milk
Confections
Candy Products
Special Diet Foods
Meat Analogs

INDUSTRIAL USES

Adhesive
Plywood
Wallboard
Insecticidal Sprays
Particle Board
Tape Joint Cements
Linoleum Backing
Texture Paints
Nutrient
Yeast
Antibiotic
Beer & Ale

Feed Uses

Calf Milk Replacers
Livestock Feeds
Poultry Feeds
Protein Concentrates
Pet Foods
Fox & Mink Feeds
Fish Food
Bee Foods


Lecithin, extracted from soybean oil, is used for everything from pharmaceuticals to protective coatings. It is a natural emulsifier and lubricant. Lecithin is used, for example, to keep the chocolate and cocoa butter in a candy bar from separating.
The dry (edible) portion of the bean provides a host edible products. Soy flours and grits are used in the commercial baking industry. They aid in dough-conditioning and bleaching. Their excellent moisture-holding qualities also help retard staling.
Soybean oil finds its way into such products as margarine, salad and cooking oils.
The soybean is the highest natural source of dietary fiber. Soy hulls are processed into fiber bran breads, cereal and snacks.
In processing, the soybeans are cleaned, cracked, dehulled and rolled into flakes. This ruptures the oil cells for efficient extraction. After removal of the soybean oil, the remaining flakes can be processed into various edible soy protein products or used to produce protein meal for animal feeds.
PAINT
PAINT
Baby Food
Soy Oil
Salad Dressing
DOG
The eight essential amino acids are found in soybeans which are necessary for human nutrition and are not produced naturally in the body.

THE SOYBE

ROLL DICE

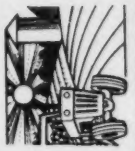
KILL WEEDS BEFORE PLANTING

PLANT OR DRILL **SOYBEAN** IN MOIST SOIL

ROTARY HOE *EARLY*

MATCH HERBICIDE WITH WEED PROBLEM

SOIL TO SEED CONTACT IS IMPORTANT



SOLID SEEDED SOYBEANS YIELD HIGHER

LOW SOIL pH **SKIP TURN**

TAKE SOIL TEST

AHEAD 2 SQUARES

PLAN SOYBEAN SYSTEM IN ADVANCE

BUY QUALITY SOYBEAN SEED

START

SOYBEAN

SKIP 3 TURNS

CONSULT YOUR VO-AG INSTRUCTOR ABOUT GROWING SOYBEANS

High Soybean Yields Require A Plan

Apply Chemicals Early

YOUNG FARMERS RAISE SOYBEANS

SOYBEAN

BRING SOYBEAN SAMPLE TO SCHOOL

BONUS 1 MOVE

EAN GAME

O DETERMINE POSITION

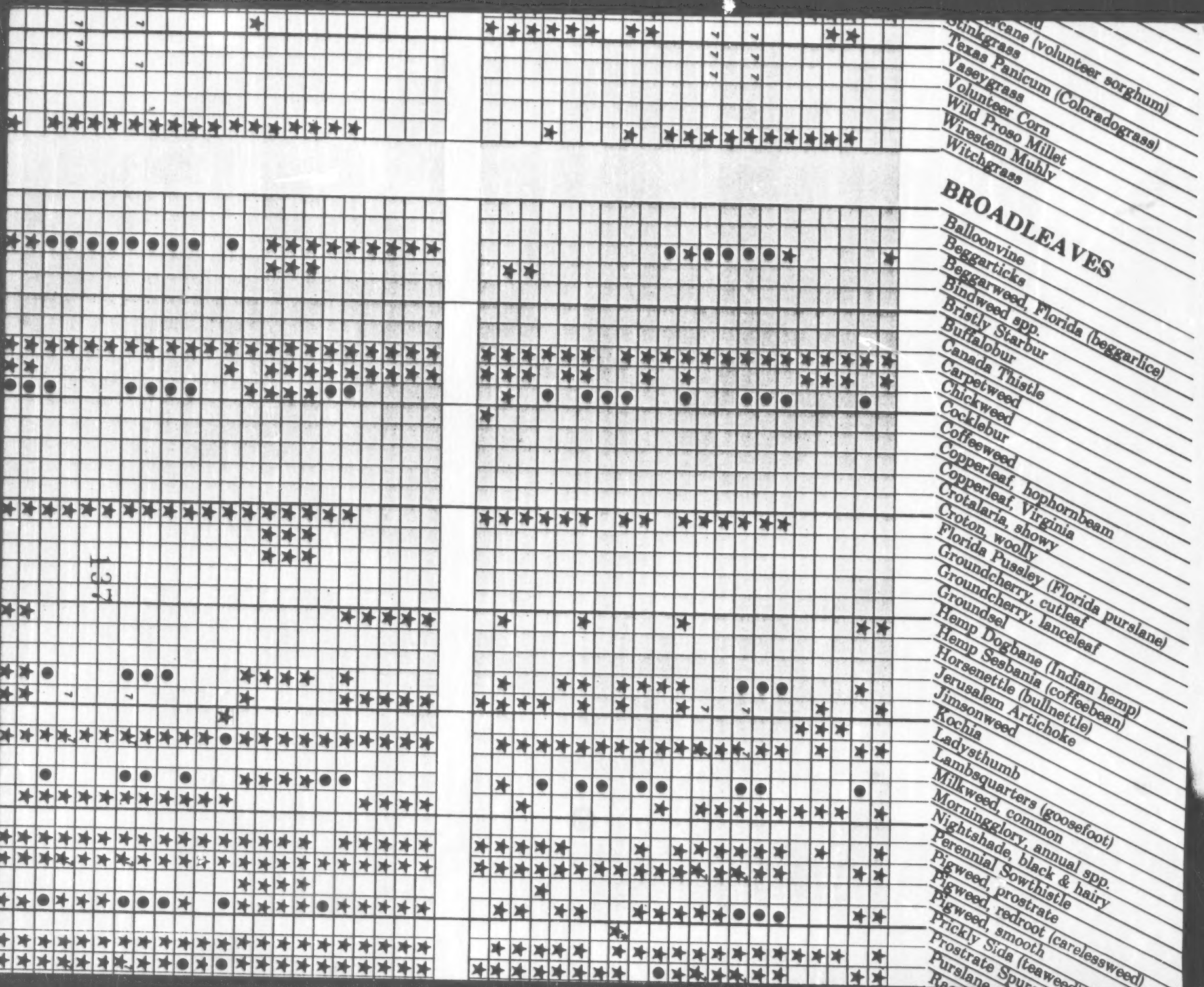
WINS
SOYBEANS
WIN
SKIP 1 TURN
POOR COMBINE ADJUSTMENT
EXTRA MOVE – NO WEEDS, FAST HARVEST
NO SOIL TESTS
BACK 3 SPACES
ARE A LEGUME
SOYBEAN CORN ROTATION
GREAT TEAM
Weed Control Is A Must
WALKING SOYBEANS FOR WEEDS IS NOT FUN
DOUBLE CROP SOYBEANS MAY FOLLOW WHEAT
I Joined Soybean Association
AHEAD 2 SQUARES
HAIL DAMAGE at stage seven-- bad news.
HARVEST SOYBEANS AT 13% MOISTURE
SOYBEANS CONTAIN OIL AND MEAL
GO TO JAIL
Soybeans Do Not Like Wet Feet
SCOUT FOR INSECTS IN SOYBEANS
VO-AG TEACHER VISITS YOUR SOYBEAN FIELD
BONUS 1 MOVE
AMERICAN SOYBEAN ASSOCIATION IS IN ST. LOUIS
LODGING HURTS SOYBEAN YIELDS
SOYBEANS
FAILED TO SET COMBINE
PRICES UP! Check Off Dollars Are Working To Sell Soybeans Overseas
Soybeans Drop Their Leaves Near Harvest
KEEP CORN OUT OF SOYBEANS

1981
Weed Control Guide

Soybean Digest

GRASSES

	Barnyardgrass (watergrass)	Bearded Sprangletop	Bermudagrass	Broadleaf Signalgrass	Cheatgrass (downy brome)	Crabgrass, large	Crabgrass, smooth	Crowfootgrass	Cupgrass, southwestern	Cupgrass, woolly	Fall Panicum (panicgrass)	Foxtail, bristly	Foxtail, giant	Foxtail, green	Foxtail, yellow	Goosegrass (bullgrass)	Johnsongrass, rhizome	Johnsongrass, seedling	Jungle Rice	Nutsedge, purple	Nutsedge, yellow	Quackgrass (couchgrass)	Red Rice	Redtop	Ryegrass	Sandbur, field	Shattercane (volu	Stinkgrass	Texas
PREPLANT TANKMIXES																													
Amiben + Dual	★					★	★				★			★	★	★	★		★									★		
Basalin + Lexone/Sencor	★					★					★			★	★	★	★										★			
Furloe + Tolban	★			★	★	★	★		★		★			★	★	★	★		★	★					★		★	★	★	
Furloe + Treflan	★	★		★	★	★	★	★			★		★	★	★	★	★	★	★	★			★		★	★	★	★	★	
Furloe + Vernam					★																				★			★		
Lasso + Lexone/Sencor	★			★		★	★				★			★	★	★	●			★		★			●					
[1] Lasso + Lexone/Sencor + Ortho Paraquat	★			★		★	★				★			★	★	★	●			★		★			●					
Lasso + Lexone/Sencor + Roundup	★			★	[7]	★[7]	★[7]				★[7]		[7]	★[7]	★[7]	★	●			●		●			●[7]		[7]		[7]	[7]
[2] Lasso + Lorox + Ortho Paraquat	★			★		★	★				★			★	★	★	●			●		●			●					
Lasso + Lorox + Roundup	★			★	[7]	★[7]	★[7]				★[7]		[7]	★[7]	★[7]	★	●			●		●			●[7]		[7]		[7]	[7]
Lexone + Dual	★			★	★	★	★	★		★	★			★	★	★	★			★		★			★	★				
Modown + Lasso	★			★		★	★				★			★	★	★	●			★		★			●					
Modown + Treflan	★			★		★	★				★			★	★	★	★								★		★	★		
Prowl + Lexone/Sencor	★			★		★	★				★			★	★	★	★									●		★		
Sencor + Tolban	★													★	★	★														
Sencor + Treflan	★	★		★	★	★	★							★	★	★	★	★	★						★	★	★	★		
Surflan + Lexone/Sencor	★			★		★	★	★		★	★		★	★	★	★	★	★										★		
Tolban + Lexone/Sencor	★			★		★	★		★		★			★	★	★	★	★	★	★							★		★	
Treflan + Amiben	★	★		★	★	★	★	★			★		★	★	★	★	★	★	★	★			★		★	★	★	★	★	
Treflan + Lexone/Sencor	★	★		★	★	★	★	★			★		★	★	★	★	★	★	★	★					★	★	★	★		
Vernam + Treflan	★		★	★		★	★				★		★	★	★	★	●	★		★	★					●		★		
PREEMERGENCE TANKMIXES																													
Amiben + Dual	★					★	★				★			★	★	★	★	★									★			
Amiben + Premerge	★					★	★				★			★	★	★	★	★									★			
Amiben + Prowl	★					★	★				★			★	★	★	★	★									★			
[3] Amiben following Treflan	★					★	★				★			★	★	★	★	★									★			
[1] Dual + Lexone/Sencor + Ortho Paraquat	★			★	★	★	★	★		★	★			★	★	★	★	★		★		★			★	★				
[2] Dual + Lorox + Ortho Paraquat	★			★		★	★			★	★			★	★	★	★	★				★			★	★				
Dyanap + Dual	★					★	★				★			★	★	★	★	★		★										
Dyanap + Lasso	★					★	★				★			★	★	★	★	★												
Dyanap + Surflan	★			★		★	★				★			★	★	★	★	★												
[3] Dyanap following Tolban	★			★		★	★		★		★			★	★	★	★	★	★	★							★		★	
Furloe + Lasso	★			★	★	★	★				★			★	★	★	●			●		●		★	●		★			
Lasso + Amiben	★			★		★	★				★			★	★	★	★													
Lasso + Dyanap	★			★		★	★				★			★	★	★	★													
Lasso + Lexone/Sencor	★			★		★	★				★			★	★	★	★	●		●		●			●					
[1] Lasso + Lexone/Sencor + Ortho Paraquat	★			★		★	★				★			★	★	★	★	●		●		●			●					
Lasso + Lexone/Sencor + Roundup	★			★	[7]	★[7]	★[7]				★[7]		[7]	★[7]	★[7]	★	★	●		●		●			●[7]		[7]		[7]	
Lasso + Lorox	★			★		★	★				★			★	★	★	★	●		●		●			●					
[2] Lasso + Lorox + Ortho Paraquat	★			★		★	★				★			★	★	★	★	●		●		●			●					
Lasso + Lorox + Roundup	★			★	[7]	★[7]	★[7]				★[7]		[7]	★[7]	★[7]	★	★	●		●		●			●[7]		[7]		[7]	[7]
Lasso + Premerge	★			★		★	★				★			★	★	★	★	●		●		●			●					
Lexone + Amiben	★			★	★	★	★	★			★			★	★	★	★	●									★			
Lexone + Dual	★			★	★	★	★	★		★	★			★	★	★	★	★		★		★			★	★				
[3] Lexone + Ortho Paraquat	●			★	★	★	★	★			★			★	★	★	★	★		●										
[3] Lexone following Dual	★			★	★	★	★	★		★	★			★	★	★	★	★												


Stinkgrass
Texas Panicum (Coloradograss)
Vaseygrass
Volunteer Corn
Wild Proso Millet
Wirestem Muhly
Witchgrass
BROADLEAVES
Balloonvine
Beggarticks
Beggarweed, Florida (beggarlice)
Bindweed spp.
Bristly Starbur
Buffalobur
Canada Thistle
Carpetweed
Chickweed
Cocklebur
Coffeeweed
Copperleaf, hophornbeam
Copperleaf, Virginia
Crotalaria, showy
Croton, woolly
Florida Pussley (Florida purslane)
Groundcherry, cutleaf
Groundcherry, lanceleaf
Groundsel
Hemp Dogbane (Indian hemp)
Hemp Sesbania (coffeebean)
Horsenettle (bullnettle)
Jerusalem Artichoke
Jimsonweed
Kochia
Ladysthumb
Lambsquarters (goosefoot)
Milkweed, common
Morningglory, annual spp.
Nightshade, black & hairy
Perennial Sowthistle
Pigweed, prostrate
Pigweed, redroot (carelessweed)
Pigweed, smooth
Prickly Sida (teaweed)
Prostrate Spur
Purslane

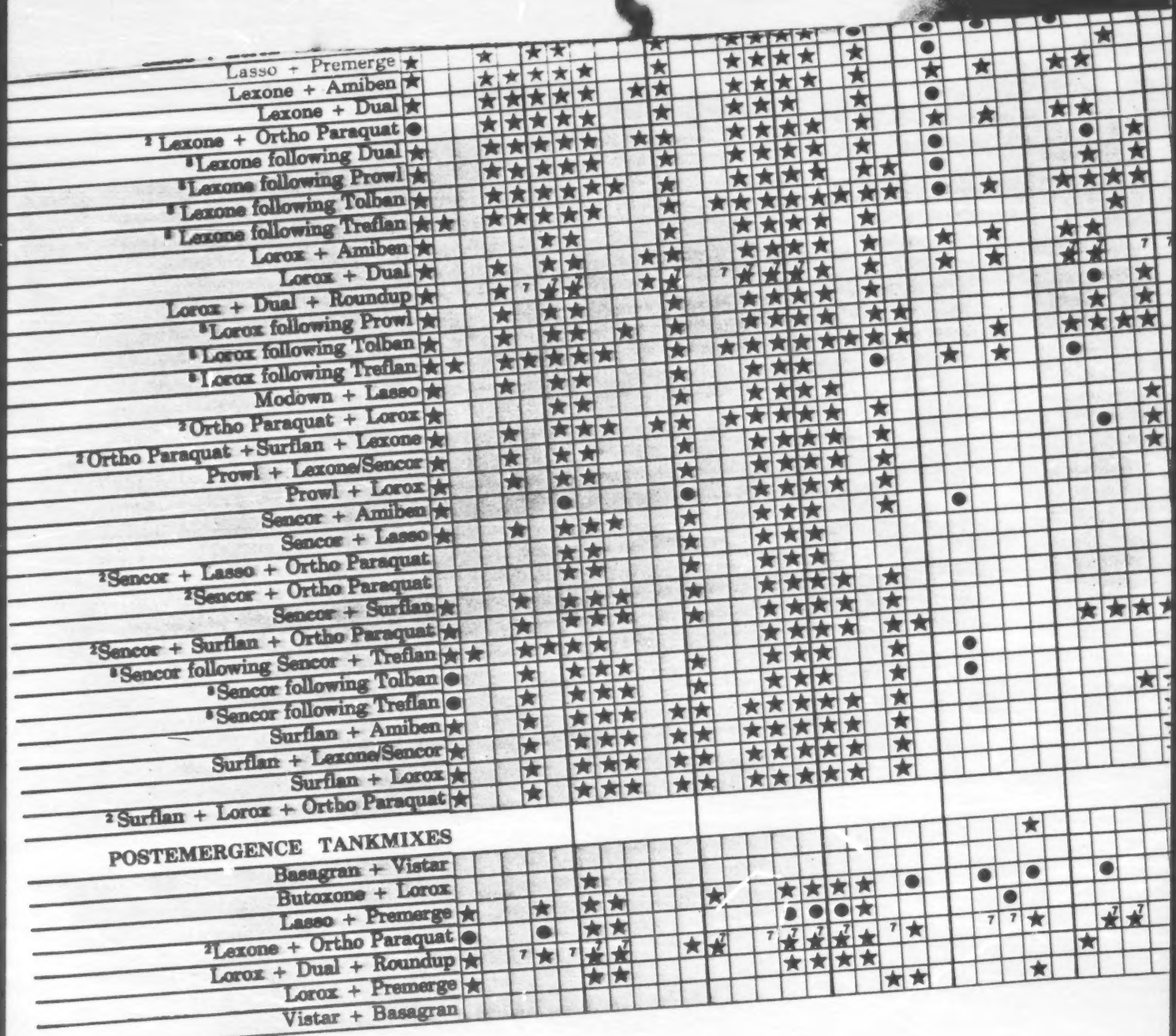
KEY TO SYMBOLS

Application method

Weed control per chemical label	Incorporated	Directed
	On the surface	Broadcast spray to weeds
★ control	Over the top	Aerial
● partial control	● Banded	★ Tankmix with fertilizer

NUMBERED FOOTNOTES ARE LISTED ON THE NEXT PAGE

Pigweed, redroot	Prickly Sida (carelessweed)	Prostrate Spurge	Purslane	Ragweed, common	Ragweed, giant	Redweed	Sicklepod	Smartweed, Pennsylvania	Smartweed, swamp	Smell Melon	Sunflower, wild	Texas Gourd	Trumpetcreeper (trumpetvine)	Velvetleaf (buttonweed)	Venice Mallow	Waterhemp, tall	Wild Mustard	Application	Other weeds controlled and notes
★		★	★				★					★			★			★	
★			★	★			★					★						★	
		★					★												Wild Buckwheat
		★					★												An bluegrass, canarygrass, raculgrass, Russian thistle, stinging nettle, wild buckwheat
		★					★												Canarygrass, wild buckwheat
●		★	★			●	★					●						★	
●		★	★				★					●							
●		★	★ [7]				★			[7]		●							No-till tankmix
★		★	★				★					●							
★		★	★ [7]				★			[7]		●							No-till tankmix
★		★	★			★	★			●		★	★		★				Wild oats
★		★	●				★					★							
★		★										★							Knotweed
	★	★	★				★					★	★		★				*Annual spurge
			★	●			★					★						★	
★		★	★	●			★					★	★		★			★	Annual bluegrass, goosefoot, knotweed, stinging nettle, Russian thistle
★		★	★		★	★	★					★						★	No tillage or light tillage prior to planting
★		★	★	●			★					★							Wild buckwheat
★		★	★			★	★					★							Annual bluegrass, raculgrass, Russian thistle, stinging nettle
★		★	★			★	★					★	★		★				Annual bluegrass, raculgrass, Russian thistle, stinging nettle
			★									★							Russian thistle
★		★	★				★					★			★			★	
★		★	★				★					★			★			★	
★		★	★				★					★			★			★	
★		★	★				★					★			★				
★		★	★			★	★			●		★	★		★				Wild oats
●		★	★			●	★					●			★				Canarygrass
★	★	★	★	★			★			★		★			★			●	
★	★	★	★	★			★			★		★			★			●	
★	★	★	★	★			★			★		★			★			●	
★	★	★	★	★			★								★				
●		★	●				★												Canarygrass, wild buckwheat
		★	★				★					●			●			★	
★		★	●				●												
●		★	★			●	★					●						★	
●		★	★				★					●							
●		★	★ [7]				★ [7]			[7]		● [7]							No-till tankmix
★		★	★				★					●						★	
★		★	★				★					●							
★		★	★ [7]				★ [7]			[7]		● [7]							No-till tankmix
●		★	★				●					●				★			Time of app preemergence or early postemergence before first leaves open
★		★	★			★	★			●		★	★			★			Russian thistle, spotted spurge, wild oats
★		★	★			★	★			●		★	★			★			Wild oats
★		●	★			★	★			●		★	★			★			Wild oats; No-till tankmix

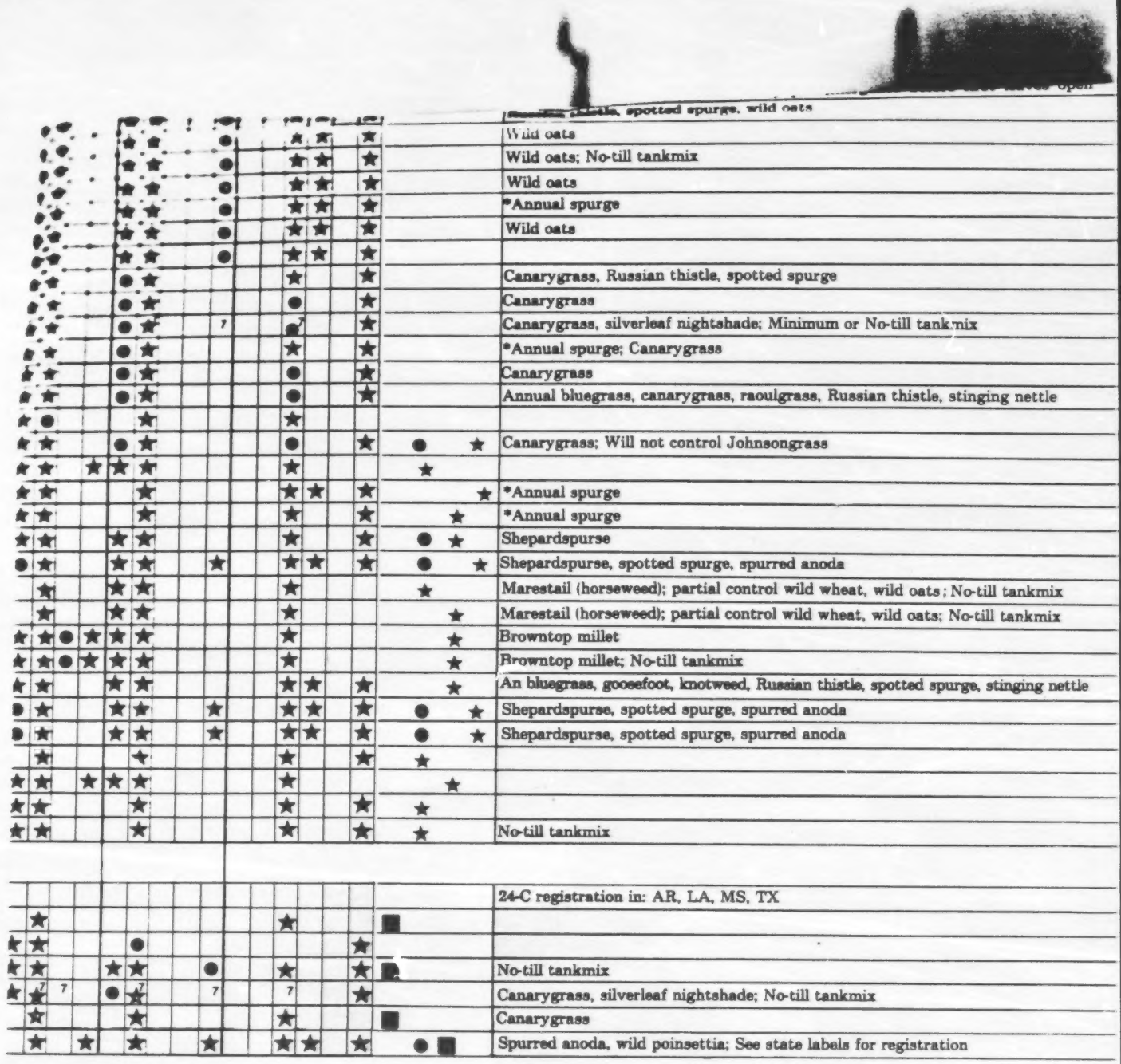

Lasso + Premerge
Lexone + Amiben
Lexone + Dual
[2] Lexone + Ortho Paraquat
[5] Lexone following Dual
[5] Lexone following Prowl
[5] Lexone following Tolban
[5] Lexone following Treflan
Lorox + Amiben
Lorox + Dual
Lorox + Dual + Roundup
[5] Lorox following Prowl
[5] Lorox following Tolban
[5] Lorox following Treflan
Modown + Lasso
[2] Ortho Paraquat + Lorox
[2] Ortho Paraquat + Surflan + Lexone
Prowl + Lexone/Sencor
Prowl + Lorox
Sencor + Amiben
Sencor + Lasso
[2] Sencor + Lasso + Ortho Paraquat
[2] Sencor + Ortho Paraquat
Sencor + Surflan
[2] Sencor + Surflan + Ortho Paraquat
[5] Sencor following Sencor + Treflan
[5] Sencor following Tolban
[5] Sencor following Treflan
Surflan + Amiben
Surflan + Lexone/Sencor
Surflan + Lorox
[2] Surflan + Lorox + Ortho Paraquat
POSTEMERGENCE TANKMIXES
Basagran + Vistar
Butoxone + Lorox
Lasso + Premerge
[2] Lexone + Ortho Paraquat
Lorox + Dual + Roundup
Lorox + Premerge
Vistar + Basagran

1981 Wee

d Contro

GLOSSARY

Indian Hemp—See hemp dogbane
Jerusalem Artichoke—*Helianthus tuberosus*
Jerusalemoak—See lambsquarters



Russian thistle, spotted spurge, wild oats
Wild oats
Wild oats; No-till tankmix
Wild oats
*Annual spurge
Wild oats
Canarygrass, Russian thistle, spotted spurge
Canarygrass
Canarygrass, silverleaf nightshade; Minimum or No-till tankmix
*Annual spurge; Canarygrass
Canarygrass
Annual bluegrass, canarygrass, raoulgrass, Russian thistle, stinging nettle
Canarygrass; Will not control Johnsongrass
*Annual spurge
*Annual spurge
Shepardspurse
Shepardspurse, spotted spurge, spurred anoda
Marestail (horseweed); partial control wild wheat, wild oats; No-till tankmix
Marestail (horseweed); partial control wild wheat, wild oats; No-till tankmix
Browntop millet
Browntop millet; No-till tankmix
An bluegrass, goosefoot, knotweed, Russian thistle, spotted spurge, stinging nettle
Shepardspurse, spotted spurge, spurred anoda
Shepardspurse, spotted spurge, spurred anoda
No-till tankmix
24-C registration in: AR, LA, MS, TX
No-till tankmix
Canarygrass, silverleaf nightshade; No-till tankmix
Canarygrass
Spurred anoda, wild poinsettia; See state labels for registration

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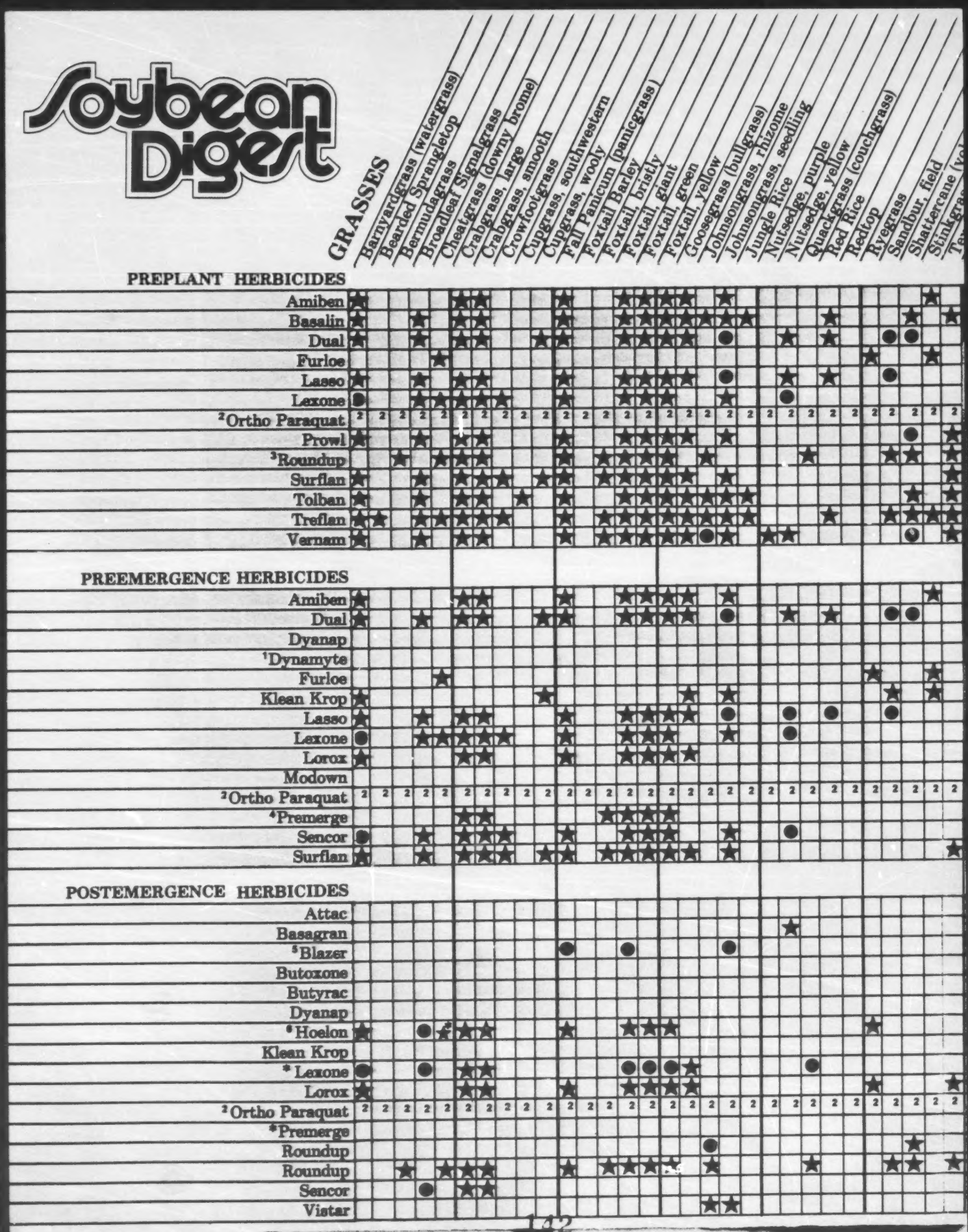
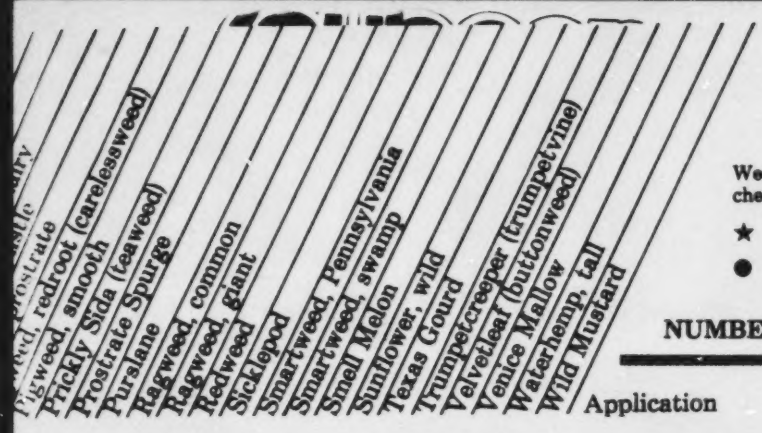
l Guide

ACKNOWLEDGEMENTS

Soybean Digest



Stinkgrass
Texas Panicum
Vaseygrass
Volunteer Corn
Wild Proso Millet
Wirestem Muhly
Witchgrass
BROADLEAVES
Balloonvine
Beggarticks
Beggarweed, Florida
Bindweed spp.
Bristly Starbur
Buffalobur
Canada Thistle
Carpetweed
Chickweed
Cocklebur
Coffeeweed
Copperleaf, hophornbeam
Copperleaf, Virginia
Crotalaria, showy
Croton, woolly
Florida Pusley
Groundcherry, cutleaf
Groundcherry, lanceleaf
Groundsel
Hemp Dogbane
Hemp Sesbania
Horsenettle
Jerusalem Artichoke
Jimsonweed
Kochia
Ladysthumb
Lambsquarters
Milkweed, common
Morningglory, annual spp.
Nightshade, black & hairy
Perennial Sowthistle
Pigweed, prostrate
Pigweed, redroot
Prickly Sida
Prostrate Spurge
Purslane



KEY TO SYMBOLS

Application method

Weed control per chemical label	Incorporated	Directed
	On the surface	Broadcast spray to weeds
★ control	Over the top	Aerial
● partial control	Banded	★ Tankmix with fertilizer

NUMBERED FOOTNOTES ARE LISTED ON THE NEXT PAGE

Application	Other weeds controlled and notes
★	Spotted spurge, Russian thistle
★	Japanese millet
★	
★	Canarygrass, wild buckwheat
★	
	Wild oats
★	
★	*Annual spurge
◀	Cattail, reed canarygrass, silverleaf nightshade, common mullein
★	
	Wild buckwheat
★	Annual bluegrass, raoulgrass, Russian thistle, stinging nettle
	Russian thistle
★	Spotted spurge, Russian thistle
★	
●	
★	Canarygrass, wild buckwheat
★	
	Wild oats
	Canarygrass
★	
	Yellow starthistle
● ★	shepardspurse, spotted spurge, spurred anoda
★	
	Insecticide; Labeled for sicklepod control in: AL, AR, GA, MS, TN, NC
	Spurred anoda, wild buckwheat, wild poinsettia
■	
● ■ ★	Curly dock, pennycress, Russian thistle
● ■	
● ■	*Acts as preemergence to cheatgrass
■	*Southern and Southeastern states only
■	Canarygrass
■	
● ■	*Controls most small seedling grasses
■ - wiper	Partial control silverleaf nightshade
■ - spray	Partial control silverleaf nightshade
■	Dayflower, Mexican weed; Partial control spotted spurge, wild poinsettia
● ■	

GLOSSARY

Balloonvine—*Cardiospermum halicacabum*
Barnyardgrass (watergrass)—*Echinochloa crusgalli*
Bearded Sprangletop—*Leptochloa spp.*
Beggarlice—See beggarweed, Florida
Beggarticks—*Bidens frondosa*
Beggarweed, Florida (beggarlice) —*Desmodium tortuosum*
Bermudagrass—*Cydodon dactylon*
Bindweed spp.—*Convolvulus spp.*
Bristly Starbur—*Acanthospermum hispidum*
Black Nightshade, see nightshade, black and hairy
Broadleaf Signalgrass—*Brachiara platyphyla*
Browntop—See fall panicum
Buffalobur—*Solanum rostratum*
Buffalograss—See Texas panicum
Bullgrass—See goosegrass
Bullnettle—See horsenettle
Buttonweed—See velvetleaf
Canada Thistle—*Cirsium arvense*
Carelessweed—See pigweed, redroot
Carpetweed—*Mollugo verticillata*
Cheatgrass (downy brome)—*Bromus secalinus*
Chickweed, common—*Stellaria media*
Cocklebur—*Zanthium spp.*
Coffeebean—See hemp sesbania
Coloradograss—See Texas panicum
Copperleaf, hophornbeam—*Acalypha ostryaefolia*
Copperleaf, Virginia—*Acalypha virginica*
Couchgrass—See quackgrass
Crabgrass, large—*Digitaria sanguinalis*
Crabgrass, smooth—*Digitaria ischaemum*
Crotalaria, showy—*Crotalaria spectabilis*
Croton, woolly—*Croton capitatus*
Crowfootgrass—*Dactyloctenium aegyptium*
Cupgrass, southwestern—*Eriochloa spp.*
Cupgrass, wooly—*Eriochloa spp.*
Downy Brome—See cheatgrass
Fall Panicgrass—See fall panicum
Fall Panicum (browntop, fall panicgrass, panicum)—*Panicum dichotomiflorum*
Florida Beggarweed—See beggarweed, Florida
Florida Purslane—See Florida pussley
Florida Pussley (Florida purslane) —*Richardia scabra*
Foxtail Barley—*Hordeum jubatum*
Foxtail, bristly—*Setaria verticillata*
Foxtail, giant—*Setaria faberi*
Foxtail, green—*Setaria viridis*
Foxtail, yellow—*Setaria glauca*
Goosefoot—See lambsquarters
Goosegrass (bullgrass, silver crabgrass) —*Eleusine indica*
Groundcherry, cutleaf—*Physalis angulata*
Groundcherry, lanceleaf—*Physalis lanceifolia*
Groundsel—*Senecio spp.*
Hemp Dogbane (Indian hemp) —*Apocynum cannabinum*
Hemp Sesbania (tall indigo, coffeebean) —*Sesbania exaltata*
Horsenettle (bullnettle)—*Solanum carolinense*
Hurrahgrass—See Texas panicum
Indian Hemp—See hemp dogbane
Jerusalem Artichoke—*Helianthus tuberosus*
Jerusalemoak—See lambsquarters
Jimsonweed—*Datura stramonium*
Johnsongrass, rhizome—*Sorghum halepense*
Johnsongrass, seedling—*Sorghum halepense*
Jungle Rice—*Echinochloa colonum*
Kochia (Mexican burning bush)—*Kochia scoparia*
Ladysthumb—*Polygonum persicatia*
Lambsquarters (goosefoot, Jerusalemoak) —*Chenopodium spp.*
Mexican Burning Bush—See kochia
Milkweed, common—*Aschlepias syriaca*
Morningglory, annual spp.—*Ipomoea et al spp.*
Nightshade, black & hairy—*Solanum spp.*
Nutgrass—See nutsedge
Nutsedge, purple—(northern or purple nutgrass)—*Cyperus rotundus*
Nutsedge, yellow—(yellow nutgrass) —*Cyperus esculentus*
Panicum—See fall panicum
Perennial Sowthistle—*Sonchus arvensis*
Pigweed, prostrate—*Amaranthus blitoides*
Pigweed, redroot (carelessweed) —*Amaranthus retroflexus*
Pigweed, smooth—*Amaranthus hybridus*
Prickly Side (teaweed)—*Sida spinosa*
Prostrate Spurge—*Euphorbia supina*
Purslane—*Portulaca oleracea*
Quackgrass (couchgrass)—*Agropyron repens*
Ragweed, common—*Ambrosia artemisiifolia*
Ragweed, giant—*Ambrosia trifida*
Red Rice—*Oryza sativa*
Redtop—*Agrostis alba*
Redweed—*Melochia corchorifolia*
Ryegrass—*Lolim spp.*
Sandbur, field—*Cenchrus pauciflorus*
Shattercane (volunteer sorghum, wild cane)—*Sorghum bicolor*
Sicklepod—*Cassia obtusifolia*
Silver Crabgrass—See goosegrass
Smartweed, Pennsylvania—*Polygonum pensylvanicum*
Smartweed, swamp—*Polygonum coccineum*
Smell Melon—*Cucumis melo*
Stinkgrass—*Eragrostis cilianensis*
Sunflower, wild—*Helianthus annus*
Tall Indigo—See hemp sesbania
Teaweed—See prickly sida
Texas Gourd—*Cucurbita texana*
Texas Panicum (buffalograss, Coloradograss, hurrahgrass)—*Panicum texanum*
Trumpetcreeper (trumpetvine)—*Campis radicans*
Trumpetvine—See trumpetcreeper
Vaseygrass—*Paspalum urvillei*
Velvetleaf (buttonweed)—*Abutilon theophrasti*
Venice Mallow—*Hibiscus trionum*
Volunteer Corn—*Zea mays*
Volunteer Sorghum—See shattercane
Watergrass—See barnyardgrass
Waterhemp, tall—*Amaranthus tuberculatos*
Wild Cane—See shattercane
Wild Mustard—*Brassica kaber v. pinnatifida*
Wild Proso Millet—*Setaria spp.*
Wirestem Muhly—*Muhlenbergia frondosa*
Witchgrass—*Panicum capillare*

1981 Weed Control Guide

Weeds rob more profits than most other soybean production enemies. But effective—and economical—chemical weed control requires a combination of elements: identification of problem weeds, proper chemical, rate and method of application—and many times, cooperation of the weather.

As part of *Soybean Digest's* commitment to profitable soybean production, we've assembled this listing of weeds and chemicals as a guide for weed identification and herbicide selection.

With the help of several weed control specialists, we've designed this guide to help you target herbicide controls to your specific weed problems.

This special foldout section contains two charts. Both use the common weed listing across the top. Down the left side you'll find single herbicide and tankmix listings.

Follow the column below a given weed to find which chemicals control that weed.

Chemicals are listed in preplant, preemergence and postemergence categories.

Other weeds controlled by a given chemical are listed in the far right column, along with colorcoded symbols which indicate method of application. Special footnotes for both charts are found on the bottom of this page.

If you don't find a weed in the top listing, check the glossary on the back. Some weeds go by other common names.

Elsewhere in this issue, you'll find photos and descriptions of problem weeds to help you identify your major pests.

Information was provided by chemical manufacturers per their labeled registrations for each product. Tankmixes and herbicides are listed as received by individual companies. In the case of tankmixes, the first herbicide name indicates which chemical company provided the information. Read the product label for more complete information on any chemical.

Inclusion or exclusion of any product or information does not reflect judgment by *Soybean Digest*. Further, *Soybean Digest* assumes no responsibility for performance of any herbicide or tankmix listed in this guide.

Check with your state Extension Service for information on herbicide performance and application suggestions for your area. Or check with a crop consultant or local farm chemical supplier.

Application rates are not included in this guide because proper rates vary in different situations.

Weed pressure, soil conditions, climate, herbicide registrations and other local conditions vary. You'll need to tailor your weed control program to your own situation.

We hope you'll find this weed guide to be a useful tool in your battle against yield-robbing weeds.

—Melissa Kennedy, Special Projects Coordinator

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FOOTNOTES

[1] Control of emerged weeds as indicated on chart.

[2] Ortho Paraquat is for kill of emerged annual broadleaf weeds and grasses and for top kill and suppression of emerged perennials. All weeds listed could fit into this category.

[3] Prior to planting soybeans or prior to soybean emergence—after weed emergence.

[4] Weeds killed if emerged at time of application for most small seeded annual broadleaf weeds and grasses.

[5] *Field bindweed; *Common and climbing milkweed; *Cypressvine, entireleaf, ivyleaf, purple moonflower, scarlet, small flower, small white (pitted), tall (common) and willowleaf (palmleaf) morningglories; *Black nightshade; *Common purslane. Also controls palmer, spiny pigweed, tropic croton, galinsoga smallflower, wild poinsettia.

[6] Labeled in: DE, IL, IN, IA, KY, MD, MI, MN, MO, NJ, OH, VA, WI.

[7] Control with Roundup after weed emergence, but prior to soybean emergence.

[8] For piggyback applications: Incorporate preplant herbicide first (listed second). In separate operation, follow with preemergence herbicide (listed first).

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